

June 21, 1932.

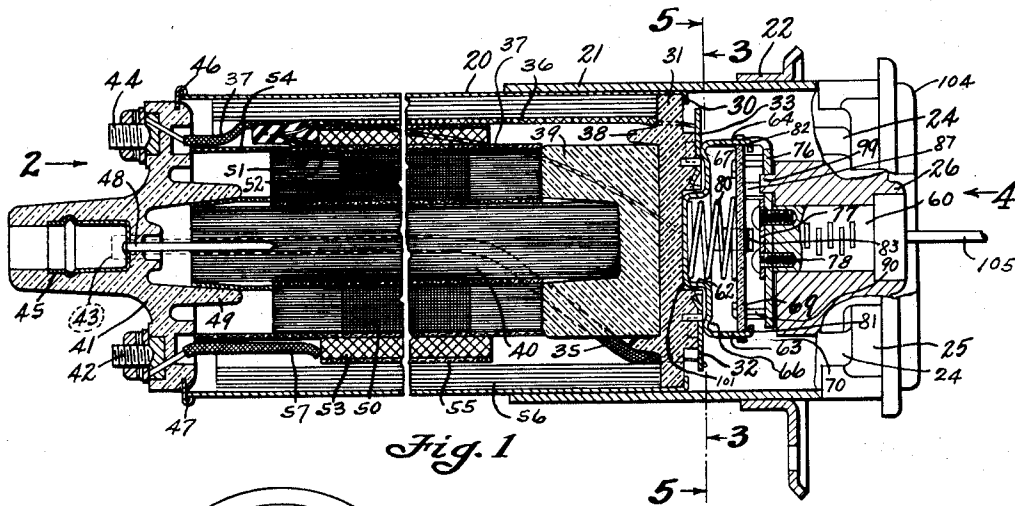
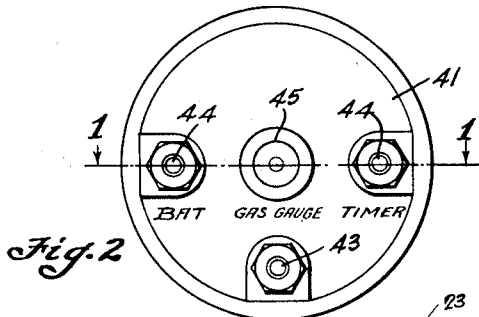
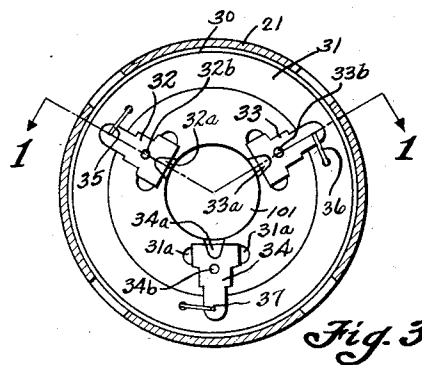
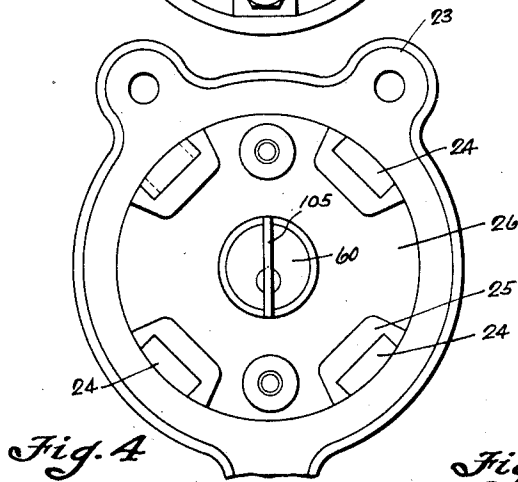
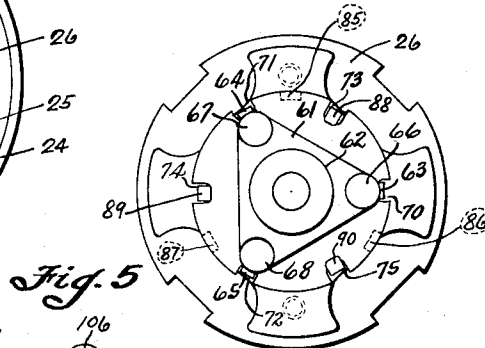
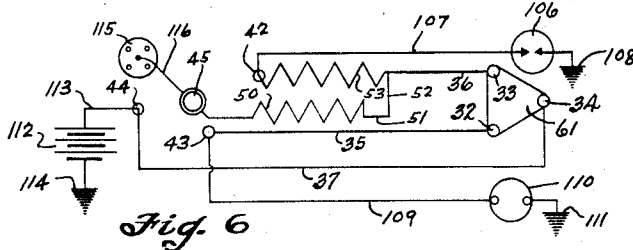
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1,864,459

SWITCH

Filed April 9, 1929

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

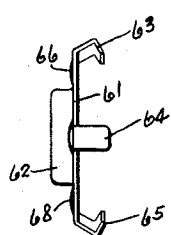


Fig. 7



Fig. 9

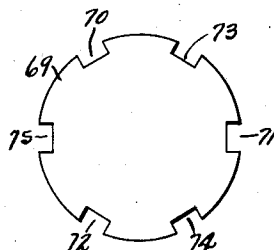


Fig. 10

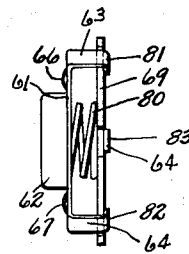


Fig. 12

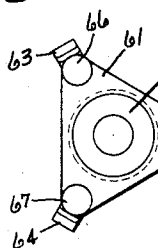


Fig. 8

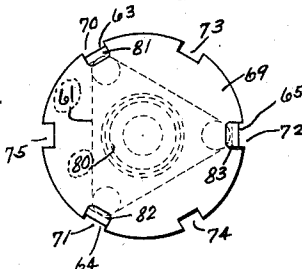


Fig. 11

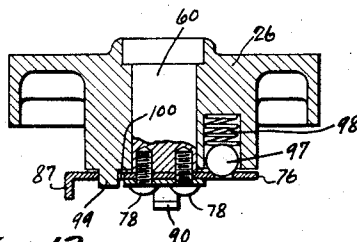


Fig. 13

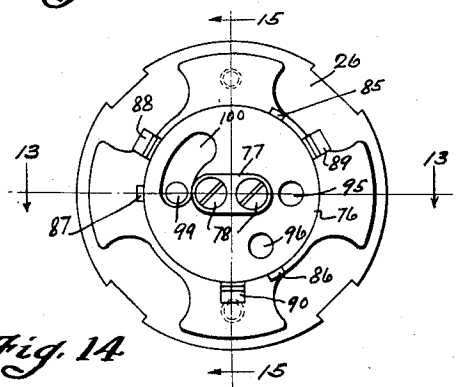


Fig. 14

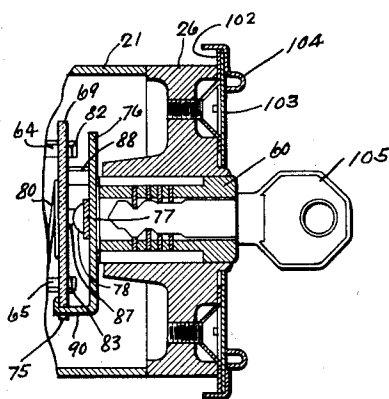


Fig. 15

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SWITCH

Application filed April 9, 1929. Serial No. 353,827.

This invention relates to a unit of ignition apparatus, embodied in a switch and coil unit and has in view to provide a unit of apparatus with which may be combined an electrically operated registering device such as a safetystat or gas gage.

It is an object of this invention to provide a simple and efficient switch structure, which will operate to control all of the circuits through said coil unit, and which may be operated to secure the circuits in the actuated position.

It is an object of this invention to provide a switch mechanism of the character described which will operate to keep the contacting elements clean and in good electrical condition by a wiping action produced at each operation of the device.

It is an object of the instant invention to provide an efficient key controlled apparatus for securing the various circuits through the unit against closing, when the actuating means are secured in one of the contact actuated positions.

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 embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a longitudinal sectional view through an improved coil and switch unit embodying my invention, and is that view substantially indicated by the line and arrows 1—1 of Figs. 2 and 3.

Fig. 2 is a rear view of the unit as indicated by the arrow 2 in Fig. 1.

Fig. 3 is a cross sectional view of the unit as indicated by the line and arrows 3—3 in Fig. 1, with the switch and actuator assembly removed.

Fig. 4 is a front view of the unit with the bezel ring and face plate removed, being a view as indicated by the arrow 4 in Fig. 1.

Fig. 5 is a rear elevation of the movable contact device and its supporting frame substantially as indicated by the line and arrows 5—5 of Fig. 1.

Fig. 6 is a diagrammatic view illustrating the circuits through the switch and coil unit illustrated herein.

Figs. 7 to 11 inclusive are detail views of the various elements contributing to the contact assembly.

Figs. 7, 9 and 10, taken together form an exploded view of the contact assembly.

Fig. 12 is a side elevation of the contact assembly removed from its associated structures.

Fig. 13 is a section through the key frame and the contact actuator assembly, substantially as indicated by the line and arrows 13—13 of Fig. 14, the driving plate having been moved to another position.

Fig. 14 is a rear elevation of the actuator assembly, and is a view substantially indicated by the arrow 14 in Fig. 13.

Fig. 15 is a vertical section through the contact assembly and actuator device, substantially as indicated by the arrows and line 15—15 of Fig. 14.

With particular reference to the drawings 20 indicates a case enclosing an ignition coil and switch unit and is attached to a sleeve 21 secured to a mounting bracket 22 provided with the apertured ears 23 for mounting the unit upon some substantial part of the vehicle structure. The sleeve 21 projects beyond the case 20 and bracket 22 to provide a switch housing, and terminates at the forward edge in the tangs 24 which may be bent into recesses 25 of a key cylinder frame 26 closing off the switch housing. The case 20 is flanged at 30, against which is secured a non-conducting coil base 31 moldably securing a plurality of contacts 32, 33 and 34, which have electrical connection through suitable leads 35, 36 and 37 respectively with elements of the ignition coil and terminal posts as will presently appear. The coil base 31 is formed with a skirt or boss 38 which positions an insulator block 39 centrally apertured to receive and support one end of the core 40. A nonconducting cap 41 provided with the terminal posts 42, 43 and 44, and the high tension terminal 45 is secured to the case 20 by the beaded ring 46 forming an interlocking connection with the flange 47 of the case.

The high tension terminal 45 is electrically connected with the core 40 by a pin 48, and the cap 41 is skirted at 49 to support the other end of the core 40 and to cooperate with the insulator 39 to secure the ignition coil centrally disposed of the case 20. Grounded to the core 40 and wound thereabout is a secondary winding 50, the outside turn of which is joined by a lead 51 to the inside lead 52 of a primary winding 53 which is superimposed upon the secondary winding and separated therefrom by an insulating sleeve 54. About the winding thus assembled is wrapped a few turns of insulating paper 55 and thence an external magnetic winding 56 which in turn is grounded to the case 20, the usual voids between the elements of the coil and case being substantially filled with a semi-fluid insulating wax as is the usual custom.

It will be noted from the illustration that the outside lead 51 of the secondary coil 50 and inside turn 52 of the primary winding 53 are joined together, and from thence by the lead 36 are connected to the switch contact 33 supported by the coil base 31 within the switch housing. The contact 33 then, has connection by way of the primary and secondary coil windings just recited, with the terminals 42 and 45 respectively on the cap 41; the circuit through the primary also including the lead 57 joining the outside turn of the primary with the post 42, while the circuit by way of the secondary includes the core 40 and the pin 48. It will be noted further that the contact 32 has connection by way of the conductor 35 with the terminal post 43, and that the contact 34 has connection by way of the lead 37 with the terminal post 44.

The contact device cooperating with the switch contacts 32, 33 and 34, is of the floating type exhibited in the attached drawings and is rotatably supported on a key controlled lock barrel 60 secured within the frame member 26. The contact device in main comprises a contact plate 61 substantially of equilateral triangular formation, which is cupped to form the cylindrical protuberance 62 and is provided with the angular extensions or tangs 63, 64 and 65 at each apex of the plate. The plate 61 is further deformed as at 66, 67 and 68 with the contact embossments which in assembled relation cooperate with the contact members 32, 33 and 34 respectively. A non-conducting plate 69 peripherially notched at 70, 71 and 72 drivingly supports the contact plate 61 and is also peripherially notched as at 73, 74 and 75 to provide engagement with a driving plate 76, secured by a lock washer 77 and screws 78 to the inner end of the lock barrel 60.

In assembling the floating contact device the spring 80 is positioned within the cup 62 of the plate 61, then the plate 69 is forced against the spring 80 and inserted between the tangs 63, 64 and 65 which are bent into

the notches 70, 71 and 72 respectively of the plate to form the assembly illustrated in Fig. 12. This arrangement will place the spring 80 slightly under compression, which, with the aid of the tangs 63, 64 and 65 resting in the notches 70, 71 and 72 and bent against the insulation plate 69 as at 81, 82 and 83 will maintain the contact plate 61 and the insulation plate 69 in spaced relation as illustrated in Fig. 12, yet limiting these elements from separation beyond that point.

As earlier stated, the contact device is drivingly supported by the driving plate 76 secured to the lock barrel 60. This is accomplished by providing the plate 76 with the spacing lugs 85, 86 and 87 arranged substantially at right angles to the driving plate 76 and so disposed as to engage the insulation plates 69 at several points about the edge thereof. The plate 76 is further provided with the driving tangs 88, 89 and 90 securing the plate 69 to an actuator assembly. In assembling the contact device on the actuator assembly the plate 69 with its associated structure forming the contact assembly as shown in Fig. 12, is superimposed upon the driving plate or the structure illustrated in Fig. 14 so that the plate 69 will engage the ends of the lugs 85, 86 and 87, and the plate 69 is then oriented relative to the plate 76 so that the notches 73, 74 and 75 will be opposite the tangs 88, 89 and 90 respectively, which are then bent into the notches to secure the plate 69 in driving relation with respect to the plate 76 and against the ends of the lugs 85, 86 and 87. This structure maintains the driving plate 76 and the nonconducting plate 69 in the spaced relation exhibited in Figs. 1 and 15, and provides for a floating function of the contact plate 61 with respect to the contact carrying plate 69, permitting the spring 80 to resiliently urge the contact plate 61 into firm engagement with the switch contacts 32, 33 and 34.

In addition to the appointments enumerated above, the plate 76 is provided with the detent apertures 95 and 96 which cooperate with a ratch ball 97 and spring 98 secured within a boss of the frame member 26. To limit the rotary motion of the contact device and hence the lock barrel 60 the frame 26 is provided with a stop post 99 which cooperates with the slot 100 of the driving plate 76, the ends of the slot limiting rotary movement of the mechanism in either direction.

After the contact device has been secured to the lock barrel 60 which forms the assembly illustrated in Fig. 15, the frame member 26 supporting this structure is then inserted within the end of the sleeve 21 defining the switch housing so that the cup 62 of the contact plate 61 is disposed in a central recess 101 of the coil base which forms a journal bearing for the inner end of the contact device. The frame member 26 is then oriented

with respect to the sleeve 21 and the tangs 24 are then pressed into the recesses 25 to secure the assembly together. The frame 26 is then covered with a screw plate 102 which in turn is covered by a dial plate 103 and finally the bezel ring 104, which finishes off the appearance of the unit as it is mounted upon the instrument board.

From the foregoing description it will be obvious that application of a proper key 105 to the lock barrel 60 will enable the driving plate 76 to be moved between the limits defined by the post 99 within the slot 100, which provides for moving the contact blade 61 into and out of engagement with the switch contact 32, 33 and 34, the key controlled means providing for retention of the switch mechanism in the circuit open relation.

In the manufacturing process of this switch it has been found advisable, when forming the coil base 31 to moldably secure the contact elements 32, 33 and 34 within the body of the base so that the face of the contacts and the base member will lie within a common plane, and so that the contacts 32, 33 and 34 are spaced substantially equidistant about the center of the base or the journal of the movable contact and properly oriented with respect thereto. To accomplish this, the contact elements 32, 33 and 34 are formed with the locating deformities 32a, 33a and 34a, and the pin-ways 32b, 33b and 34b respectively, which cooperate with complementary parts of the mold to properly position the elements for being moldably secured to the base 31. The base 31, is also molded to present the recess or depression 31a, at each side of the contact elements at the points of engagement with the movable element 61, so that arcing between the contact elements will be through the air, and thereby not scorch, burn or melt the molding material supporting the parts.

The instant coil and switch unit when mounted upon the vehicle has connection in the various circuits as illustrated in Fig. 6, in which the terminal post 42 is connected with a timer 106 by way of a conductor 107 and thence to the ground at 108. The terminal post 43 is connected by a lead 109 to a safetystat or gas gage 110 and thence to the ground at 111, and the terminal 44 is connected to a battery 112 by a lead 113 and thence to the ground at 114. The high tension terminal 45 is connected to a distributor 115 by a lead 116. Thus it is seen that manipulation of the contact element 61 will control circuits from the battery through the common connection 37 to the contact 34, and from thence both the ignition circuit through the contact 33, and the indicator or register circuit through the contact 32. Due to the style and arrangement of the parts of the unit, the switch contacts are kept in good electrical condition by the wiping action of

plate 61 in moving over the switch contacts 32, 33 and 34, the spring 80 urging the plate 61 into firm engagement with the coil base 31 and switch contacts.

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. In a switch and coil unit the combination comprising, a coil base providing a plurality of switch terminals, means connecting said switch terminals to terminal posts associated therewith, a floating contact member journaled in said coil base and adapted for coincidental engagement with all of said switch contacts, said contact member including means mating with the coil base to prevent lateral displacement of the member relative to the switch terminals, and means for actuating and securing said contact member in its actuated position.

2. In a switch and coil unit the combination comprising, a case enclosing said coil and providing a switch housing, a centrally recessed base providing a plurality of switch terminals within the switch housing in concentric arrangement about the recess, a cap providing a plurality of terminal posts electrically connected to said switch contacts, a floating switch contact device journaled in said base and adapted for engagement with said switch contacts, said device including a plate having a cup mating with the recess of said base, whereby the device is maintained in axial alignment with the switch terminals, an actuator assembly adapted to open and close circuits through said contacts and terminal posts.

3. In a switch and coil unit the combination comprising, a case providing a switch housing, a base providing a plurality of switch terminals within the switch housing, a cap secured to the case and providing a plurality of terminal posts electrically connected to said switch contacts, a floating switch contact device journaled in said base and adapted for engagement with said switch contacts, an actuator assembly closing said switch housing and adapted to open and close circuits through said contacts, said floating contact device including, a triangular plate centrally cupped to provide a bearing in said base and having axially extending tangs received in peripheral notches of a nonconducting plate, resilient means positioned in said cup and bearing against said plate normally urging the parts in separation, said plate being drivingly connected to said actuator assembly.

4. In a switch and coil unit the combination comprising, a coil base providing a plurality of switch contacts, a floating contact

device journaled in said coil base and adapted for engagement with said switch contacts, and means for actuating and securing said floating device in its actuated position, and means maintaining the contact device in axial alignment with said contacts.

5. The combination set forth in claim 4, in which said device includes a triangular plate cupped to provide a cylindrical bearing, said coil base being recessed to receive said cylindrical bearing, an insulation plate supporting said triangular plate, a spring positioned in said cup tending to separate the contact plate from said insulation plate, a driving plate secured to the insulation plate, and means for actuating the driving plate.

6. The combination set forth in claim 4, in which the floating contact device includes a contact plate centrally cupped to provide a bearing to be journaled in said coil base, a contact urging spring seated in the cup, a nonconducting plate secured to the contact plate, said contact plate provided with angular tangs, seated in peripheral notches of the nonconducting plate and confining the contact urging spring between the cup and the nonconducting plate, and a driving plate securing said non-conducting plate to the actuating means.

7. In a switch unit the combination comprising, a centrally recessed base providing a plurality of switch contacts, a floating contact device journaled in said switch base and adapted to engage the switch contacts, said contact device comprising a contact plate cupped to form a bearing to be received by said base recess, a non-conducting plate, angular extensions upon the contact plate seated in peripheral notches of the nonconducting plate, spring means seated within said cup and urging said contact plate away from said nonconducting plate, an actuator assembly rotatably supporting and securing a driving plate, said driving plate providing a plurality of tangs drivingly engaging said nonconducting plate.

8. In a switch unit the combination comprising, a base providing a plurality of switch contacts, a floating contact device journaled in said base and adapted to engage the contacts, said contact device comprising a contact plate cupped to form a bearing to be received by said base, a non-conducting plate, angular extensions upon contact plate seated in peripheral notches of the nonconducting plate, spring means seated within said cup and urging said contact plate away from said nonconducting plate, an actuator assembly rotatably supporting and securing a driving plate, said driving plate providing a plurality of tangs drivingly engaging said nonconducting plate, some of said tangs securing said driving plate and nonconducting plate against separation, while

the remaining ones restrain said plates in fixed spaced relation.

9. In a switch the combination comprising, a switch base providing a plurality of switch contacts, a floating contact device journaled in said switch base and adapted to engage all of said switch contacts, said contact device comprising a contact plate cupped to form a bearing to be received by said switch base, angular extensions upon said plate seated in peripheral notches of a nonconducting plate, means between said contact plate and support urging said plate into engagement with said switch contacts, and manually operable means driving said contact device.

10. A switch comprising in combination, a coil base providing a terminal plate having a plurality of switch contacts, a floating switch contact device journaled in said coil base and adapted for engagement with said switch contacts, an actuator assembly adapted to open and close circuits through said contacts, said floating contact device including, a triangular plate centrally cupped to provide a bearing in said coil base and having axially extending tangs received in peripheral notches of a nonconducting plate, resilient means positioned in said cup and bearing against said plate normally urging the parts in separation, said plate being drivingly connected to said actuator assembly.

11. A switch comprising in combination, a terminal plate having three contact terminals equally spaced about a central point, a floating switch contact device journaled in said plate and providing means for simultaneously engaging all of said contact terminals, an actuator assembly adapted to open and close circuits through said contacts, said floating contact device including, a triangular plate centrally cupped to provide a bearing in said terminal plate and having axially extending tangs received in peripheral notches of a nonconducting plate, resilient means positioned in said cup and bearing against said plate normally urging the parts in separation, said plate being drivingly connected to said actuator assembly.

12. A switch comprising in combination, a case, a wall of said case providing a plurality of switch contacts, a triangular plate cupped to provide a cylindrical bearing, said wall being recessed to receive said cylindrical bearing, an insulation plate supporting said triangular plate, a spring positioned in said cup tending to separate the contact plate from said insulation plate, a driving plate secured to the insulation plate, and means for actuating the driving plate.

13. A switch comprising in combination, a case, a wall of said case providing a plurality of switch contacts, a floating contact device journaled in said wall and adapted to engage the switch contacts, said contact device comprising a plate cupped to form a bearing to

be received by said wall, a supporting plate, extensions of the cupped plate having peripheral engagement with the supporting plate, means situated within said cup tending to separate the cupped plate from the supporting plate, means for actuating the contact device including a driving plate provided with tangs engaging the supporting plate.

14. A switch comprising in combination, a terminal plate having a cylindrical recess, a plurality of switch contacts arranged in a circular row concentric with said recess, a floating contact device for simultaneous engagement with all of the switch contacts, including a contact plate having a cup portion journaled for rotation in the plate recess, said recess and cup piloting the movement of the contact device, so as to maintain the same in axial alignment with the row of switch contacts.

15. In a switch and coil unit, the combination comprising, a tubular housing for enclosing an ignition coil, an end wall for the housing, switch contacts insulatingly supported by the end wall, a sleeve surrounding the housing and fixed thereto and projecting beyond said end wall to provide a switch enclosure, a member adapted to be fixed against the projecting edge portion of the sleeve, a rotary controller carried by said member, and a rotary movable contact operated by the controller and cooperating with the contacts on the end wall member.

16. In a switch and coil unit, the combination comprising, a unitary subassembly comprising a tubular housing for enclosing an ignition coil and having an end wall member, switch contacts insulatingly supported by the end wall member, and a tubular sleeve surrounding the housing and fixed thereto and extending beyond said end wall member to provide a switch enclosure; and a unitary subassembly comprising a member adapted to be fixed against the projecting edge of the sleeve and a rotary controller mounted on said member; and a rotatable switch contact adapted to cooperate with said contacts on the end wall member and drivingly connected with the controller.

17. In a switch and coil unit, the combination comprising, a unitary subassembly comprising a tubular housing for enclosing an ignition coil and having an end wall member, switch contacts insulatingly supported by the end wall member, and a tubular sleeve surrounding the housing and fixed thereto and extending beyond said end wall member to provide a switch enclosure, and having tangs projecting beyond its projecting peripheral edge of the sleeve; and a unitary subassembly comprising a member adapted to be fixed against said peripheral edge of the sleeve and having notches respectively for receiving said tangs of the sleeve, said tangs being bent over against the outer side of said

member after said member and sleeve are assembled, a rotary controller mounted on said member, and a rotatable switch contact adapted to cooperate with the contacts on the end wall member and drivingly connected with the controller.

18. In a switch and coil unit, the combination comprising, a tubular housing for enclosing an ignition coil which includes windings and a core, a non-conducting end wall member for the housing and having within the housing an annular boss for supporting the core and providing exteriorly of the housing a bearing for a movable switch contact, stationary contacts carried by the end wall member, a rotary contact journaled upon said bearing and adapted to cooperate with the stationary contacts, a rotary controller drivingly connected with the rotary contact, and a switch case including the housing end wall member, a member carrying the controller and means for securing the member to the case.

19. In a switch and coil unit, the combination comprising, a tubular housing for enclosing an ignition coil which included windings and a core, a nonconducting end wall member for the housing and having within the housing an annular boss for supporting the core and providing exteriorly of the housing a bearing for a movable switch contact, stationary contacts carried by the end wall member, a rotary contact journaled upon said bearing and adapted to cooperate with the stationary contacts, a rotary controller drivingly connected with the rotary contact, and a switch case including the housing end wall member, a member carrying the controller and a tubular member surrounding the coil housing and fixed thereto and having a peripheral edge portion fixed to the controller carrying member.

20. In a switch and coil unit, the combination comprising, a tubular housing for enclosing an ignition coil, an end wall for the housing, switch contacts insulatingly supported by the end wall, a sleeve surrounding the housing and fixed thereto and projecting beyond said end wall to provide a switch enclosure, a member adapted to be fixed against the projecting edge portion of the sleeve, a rotary controller carried by said member, and a rotary movable contact operated by the controller, a compression spring located between the movable contact and controller and tending to separate them, and means for securing said controller carrying member to said sleeve and for holding the spring under compression whereby the rotary contact is urged by the spring toward the stationary contacts.

21. In a switch and coil unit, the combination comprising, a tubular housing for enclosing an ignition coil, an end wall for the housing, switch contacts insulatingly supported by the end wall, a sleeve surrounding

the housing and fixed thereto and projecting beyond said end wall to provide a switch enclosure, a member adapted to be fixed against the projecting edge portion of the sleeve, a rotary controller carried by said member, a rotary movable contact, a contact carrier splinedly connected with the movable contact, a compression spring located between the carrier and movable contact and tending to separate them, means provided by the movable contact and carrier for limiting separation of the contact from the carrier, and means for securing the controller carrying member to said sleeve and for decreasing the distance between the movable contact and the carrier whereby the spring is compressed beyond its initial state of compression and the movable contact is urged toward the stationary contacts.

In testimony whereof I hereto affix my signature.

HARRY E. NORVIEL.

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