May 13, 1941. L. O. PARKER 2,242,142

LOCK SWITCH COIL

Original Filed Aug. 3, 1935

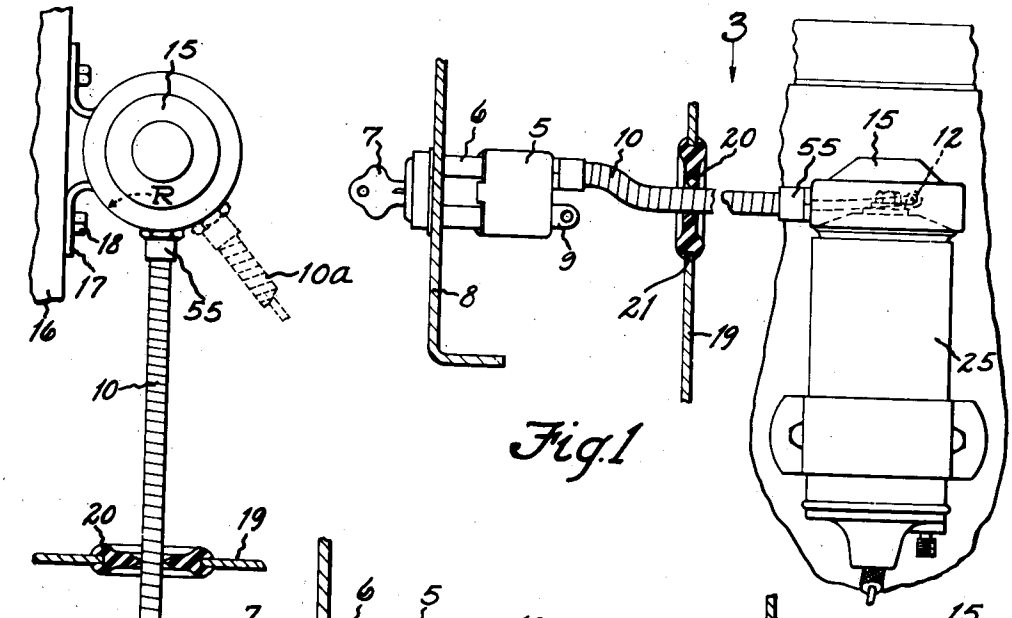


Fig. 1

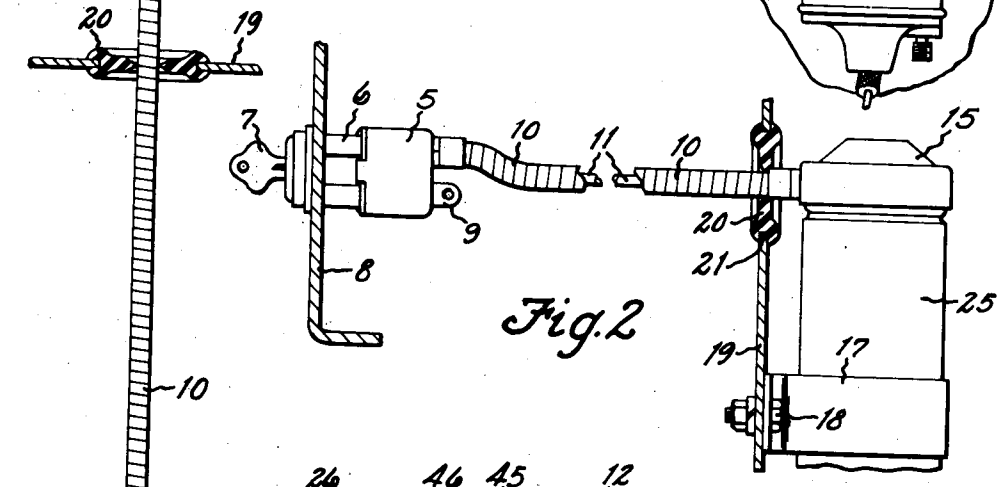


Fig. 2

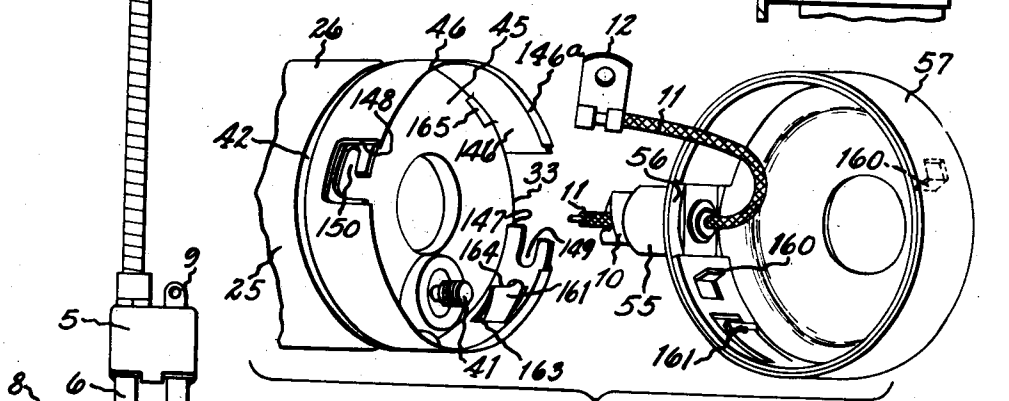


Fig. 4

Fig. 3

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LOCK SWITCH COIL

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7 Claims. (Cl. 180—82)

This invention pertains to theft preventing devices in and about automotive vehicles, and is more particularly directed to that class of ignition equipment known as extension lock-switch coils, this application being a division of my copending application Serial No. 34,556, filed August 3, 1935, and now Patent 2,173,612.

One of the objects of this invention is to provide an extension lock-switch coil as a complete assembly that will afford a maximum of theft-proof protection.

Another object is to provide a lock-switch and coil assembly adapted to be mounted as a unit upon a support in non-separable relation, and that must be removed at least in part from its support before the contributing sub-assemblies can be parted.

Another object is to provide a lock-switch and a coil for self-locking engagement by sequential telescopic movement and partial relative rotation, whereby an assembly is provided that is proof against unauthorized separation.

Another object is to provide a lock-switch coil assembly that insures against unauthorized tampering, yet lends itself to repair and/or servicing of the contributing parts by an authorized agent.

A more specific object is to provide an extension lock switch coil assembly for automotive use, in which a lock switch and ignition coil are each separately and rigidly mounted on relatively remote parts of the automotive vehicle, and a flexible armored electrical connection joins the switch and coil both mechanically and electrically and includes a cover for cooperating with the coil to enclose the electrical connections, with means provided by the coil and cover for securing the cover to the coil housing and requiring relative rotary movement between the coil and cover to disengage them, said armor being of such length that, when the switch and coil are mounted in position upon the automotive vehicle, the cable is substantially taut, thereby preventing relative rotary movement between the coil and cover.

Still another object, among others, is to provide a lock-switch coil assembly that is proof against tampering or unauthorized use, yet is readily separable into its component parts for service or replacement, by following a definite procedure.

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

In the drawing:

Fig. 1 is essentially an elevational view, with certain parts shown in section, of the improved extension lock-switch ignition coil, and its method of mounting by which the invention disclosed herein is perfected.

Fig. 2 is an elevational view of a modification with certain parts shown in section.

Fig. 3 is a plan view as indicated by the arrow 3 of Fig. 1.

Fig. 4 is an open view in perspective, showing details of one form of coil casing and lock-switch coupling.

Reference to the drawing will illustrate by what means the invention disclosed herein is perfected. At 5 is indicated a switch mechanism fitted with a lock barrel 6 responsive to an appropriate key 7 for actuating the switch device, and for securing the same in a desired circuit connection. It is customary to mount the lock switch upon a support 8, conveniently accessible to the operator of the vehicle, which in the illustrated embodiment may be the instrument panel. The switch device is provided with a circuit terminal 9, to which a source of current, for instance a battery, is usually connected. A flexible armored conduit 10 is non-demountably secured to the switch device, and encloses an electric insulated lead 11 ending with a terminal clip 12, adapted to be connected to a terminal of a coil assembly. The lock switch and armored cable assembly thus far described is adequately disclosed in U. S. Patent 1,983,096, granted December 4, 1934, to L. O. Parker, reference to which is here made for more complete disclosure of the details of construction.

The end of the armor remote from the lock-switch is non-demountably secured to a coil cup or cover assembly 15, that is adapted for spring lock or other securing connection to a coil assembly 25. The coil is mounted upon a support such as a motor block 16, by an appropriate bracket 17 and screws 18, and the flexible armor 10 extending between the lock switch and the cover assembly is of a length to just conveniently reach between the two, such that there may be no substantial flexing or stretching of the armor to permit relative rotation or other designed movement between the cover assembly 15 and the coil assembly 25 when the parts have been mounted in their operative relation. That mounting relation is shown in Fig. 3. In the instance of Figs. 1, 2 and 3, this installation includes passing the flexible armor 10 through an aperture in the bulk head or motor board 19, where the intermediate portion of the conduit

is supported by a noiseless packing such as a grommet 20. This installation is particularly desirable where the length of armor between the switch and coil is of substantial length, in that the bulk head support at the intermediate portion of the armor tends to prevent stretching or flexing of the armor, or other lateral swinging movement incident to rotating the cover assembly on the coil as mounted.

In Fig. 2 there is illustrated a modification of the coil mounting means, in that the bracket 17 is secured by the screw devices 18 directly upon the bulk head 19. The grommet 20 in this instance is adjusted about the end of the armor 10 adjacent to its connection with the cover assembly 15. For this mounting, the bulk head 19 is provided with an opening 21, of sufficient size to allow the passage of the largest part of the lock switch, and the grommet 20 being of yieldable or substantially live rubber, in the form of a disc or washer may be stretched over the lock and switch after that assembly is complete. The aperture through the grommet is sufficiently small to closely and firmly embrace the armor 10, in its free state. When the grommet has been set in position, it forms an intermediate support for the armor, and prevents rattling between relatively loose parts.

As hereinabove described, the cover assembly 15 is secured to the coil assembly 25 by a spring lock or other securing device, responsive to telescopic movement of the two sub-assemblies.

While there is shown in detail, means for effecting an automatic lock retention of the parts upon completion of the uniting movement, the invention comprehends also structures that are secured in coupled relation by other means preventing reverse relative movement that might effect separation of the parts. The specific spring latch mechanism by which the coil and lock assemblies are secured together is claimed in the parent application of which this application is a division, and to which reference is here made for the full description and operation. It need only be said, then, that the spring latch means of the completed assembly is so situated with respect to the unit in its mounted relation, that the localized point of release is relatively non-accessible, and may be actuated for parting of the assemblies only upon removal of the coil unit from its support. In the disclosed embodiment this localized point of connection or release is situated on the back side of the coil at a point between the support and the juncture of the armor 10 with the cover assembly 15 as indicated at R in Fig. 3. The point of release, access to which must be had in order to part the contributing assemblies is therefore inconveniently accessible, since there is only a limited amount of space available for inserting the proper tool, and hardly enough clearance for working the tool in order to raise the latch of the locking device. By this, it is made extremely difficult for the would-be thief, or the unauthorized service agent to tamper with the device.

However, even should there be success upon inserting the tool at the point R, and even should the latch be successfully raised out of its recess, insufficient relative rotation could be accomplished between the cover assembly 15 and the coil assembly 25 to permit parting of the unit, since the armor extended between the lock switch and the cover assembly is already taut and cannot be flexed sufficiently to accomplish the desired end. Thus, a construction and installation has been devised that will forestall substantially any unauthorized attempt to alter the ignition system. Much time is involved, and the problem becomes so difficult for one not possessed of the secrets of the procedure, that an unauthorized person will give up the attempt in a very short time and before accomplishing any satisfactory result.

One means illustrative of the securing connection between the ignition coil and the lock-switch assembly is shown in Fig. 4, where the coil assembly 25 comprises a can 26 enclosing the usual windings and closed at one end by an insulator or coil base 33 providing a terminal 41, all as is well known to those experienced in the art.

The can 26, or casing as it is sometimes called, has provisions, here including the circumferential rib 42 rolled into the body of the can so as to engage one side of the coil base 33, thereby securing the coil base rigidly in position near one end of the casing so as to divide the casing into what may be called a coil compartment, and a terminal compartment or chamber 45. The can 26 is extended sufficiently beyond the partition or coil base to form the side walls of the terminal compartment, and this extension of the case which will be referred to broadly as 46 is notched appropriately to receive the cover or closure assembly 15.

The cover assembly 15 is designedly fashioned to cooperate with the coil case in forming a spring lock retaining means between the two, so that union of the two assemblies may be accomplished by telescopic movement of the two assemblies, or as it may be more definitely stated, by sequential telescopic movement and partial relative rotation. It has been earlier stated that the armor 10 enclosing the insulated conductor 11 is non-demountably connected to the cover assembly 15, and this is accomplished as shown in the illustrated embodiment, by providing a ferrule-like member 55 that may be welded or brazed to the end of the armor 10, and peened over or riveted after passing through the side wall 56 of a cup-like member 57 providing the essential part of the cover assembly 15. Secured within the cup 57 there are latch provisions, including bayonet portions or extensions 160, and a spring tongue 161 that may cooperate with complementary portions on the coil case for holding the parts 15 and 25 together after the stated sequential movements.

Can extension 46 is notched at diametric points as at 147 and 148, and a separate retainer ring 146 is placed within the can extension 46 where it is pressed against the coil base 33 urging the same against the rib 42 of the can, while the terminating edge of the can extension 46 is turned over the edge of the ring 146 to secure the same in place substantially as indicated at 146a. The ring is likewise provided with an enlarged aperture 163 that provides a shoulder portion 164 acting as a detent or latch recess for a spring tongue 161. Making for better engagement between the retainer ring and the coil base 33, the ring is provided with extended portions 165 deflected toward the axis of the assembly so as to present an increased amount of engagement with the insulator 33. The retainer ring 146 provides the retaining portions 149 and 150 usually recognized as bayonet slots, and they are so situated as to coincide with the notches 147 and 148 respectively in the can extension 46 when the same is assembled in place.

With assembly units constructed according to the foregoing disclosure, provision is made for

releasably locking the cover assembly **15** to the coil assembly **25**, so that the unauthorized agent will have considerable difficulty in, if not be prevented from, parting the assemblies. Yet, one having information as to the proper procedure can, when not under the urgency of very limited period of time, successfully accomplish the parting of the assemblies without injury to either part.

There has been given a detailed description of one means for effecting a securing relation between the oil unit and the lock switch unit, that incorporates a spring latch automatically operable upon completion of the sequential movement to forcibly retain the contributing parts in coupled relation. However, the improvement comprehends lock-switch coils with other forms of securing means, either with or without latch means, which cannot be uncoupled or separated unless at least one of the contributing elements is removed from the support. One such organization is a simple bayonet type union between the cap **15** and the coil unit **25** that requires substantial relative rotative movement of the parts, for example in the order of thirty to sixty degrees (30° to 60°).

In making an installation, and before uniting the cover assembly with the coil assembly, the lock-switch with its attached armor and cover assembly is to be mounted in the desired or provided position substantially as shown. Then, the terminal clip **12** is passed over and secured in place to the coil terminal **41** by the usual nut. This having been completed the telescopic engagement of the cover assembly with the coil assembly is accomplished, and the parts **15** and **25** rotated relative to one another to accomplish the securing relation.

In instances where the securing relation includes a latch or lock, the partial relative rotation between the cover assembly and the coil assembly will cause the latch to move into the latch recess and engage a shoulder, which will prevent reverse sequential movement, by which the assemblies might be parted. In those instances where a latch is not used, the partial relative rotation of the parts **15** and **25** will secure the parts against separation until an equal reverse relative rotation is effected. The securing connection being established, the coil assembly may then be mounted as suggested in Fig. 3.

The coil is then mounted on its support **16** so that the armor **10** is stretched relatively taut between the switch **5** and the coil **25**, or from end to end, in which relation it is secured by the screw devices **18** through the bracket **17** and into the support **16**, or bulk head **19**. Lock washers and nuts where needed will make removal more difficult, and insure a non-rattle connection. In that relation the cap **15** cannot be rotated relatively to the coil **25** because the armor **10** cannot be bent or stretched sufficiently to permit it. The design of the securing connection between the lock switch unit and the coil unit is such as to require relative rotative movement of the parts, somewhat as indicated by **10a** in Fig. 3, before the parts can be separated. That relative rotative movement cannot be accomplished so long as both of the coupled parts are mounted on their respective supports with the armor connecting them relatively firm and taut.

When it is desired to part the assemblies, either the coil **25** or the lock switch **5** must be removed from their respective supports so as to permit bending of the armor **10** in rotating the cap **15** or rotation of the coil **25** relative to the cap. That is because, as mounted, the armor **10** cannot be bent, flexed or swayed enough to permit the necessary reverse relative rotation to release the securing means. Also, when a latch tongue is used, the mounting of this coil assembly makes separation more difficult because a tool cannot well be inserted at the localized point R of cover-coil relation until the coil has been removed from its support. Therefore as respects a cover and coil case that do incorporate a latch at the end of the relative rotative movement, separation of the parts cannot be effected even after the latch is disengaged, except when either the coil or the lock switch is removed from its respective support. When the screw devices **18** have been removed, the coil assembly **25** may then be swung outwardly from its support by reason of the flexibility of the armor **10**, and the cap and coil may then be separated. Repair or replacement then is easily made, and remounting of the parts in the prescribed manner insures equal protection for the future.

While the 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. A protective mounting for a container adapted to be attached upon a support, comprising in combination, a coil housing having an open end; a cover having a flange to fit around the open end of the housing, said cover and the housing end having provisions for retaining the cover on the housing; means carried by the housing for attaching the housing to the support, conductive means including a switch mounted at a remote point for controlling a circuit through the coil, a flexible armor extending substantially taut between the coil and switch, and in such manner as to prevent disassociation of the retaining means between the coil end and cover until the attaching means for the coil has been removed from the support.

2. In an extension lock-switch coil, means for preventing unauthorized access to the interior elements thereof, comprising in combination, a coil assembly providing a terminal, a cover assembly including a flexible armored conduit and a cap enclosing a conductor for the terminal, means for releasably securing the cover assembly to the coil assembly upon relative rotation of the assemblies, said assemblies being separable when so secured only by reverse relative rotation, means for supporting the coil assembly and the cover assembly in the secured relation, means firmly supporting the remote end of the armor so as to be relatively non-flexible and so that reverse relative movement of the assemblies cannot be accomplished for separation thereof, due to the relative inflexibility of the armor as supported, and until the coil assembly is removed from its support.

3. In an extension lock switch coil, means for preventing unauthorized access to the interior elements thereof, comprising in combination, a coil assembly having a case extension surrounding a terminal, a lock-switch and cover assembly including a flexible connecting armor enclosing a wire adapted to be connected to the terminal, means for releasably securing the cover assembly to the case extension upon relative rotation thereof, said securing means being releasable only by reverse relative movement; means for sup-

porting the coil assembly and the lock switch of the cover assembly in their secured relation, and so that the connecting armor is relatively non-flexible, said armor when thus mounted cooperating with the supporting means to prevent sufficient reverse relative movement of the assemblies for separating the same, until the coil assembly has been removed from its support.

4. An extension lock-switch coil assembly for automotive use, comprising a switch provided with means for mounting it upon an instrument panel of an automotive vehicle, a coil having means for mounting it upon a support remote from the instrument panel, a terminal supported by the coil, a cover cooperating with the coil for enclosing the terminal, means provided by the coil and cover for securing the cover to the coil housing and requiring relative rotary movement between the coil and cover to disengage them, a wire connecting the switch and coil terminal, and a flexible armor tube enclosing the wire and permanently attached to the switch case and cover, said cable being of such length that, when the switch and coil are mounted in position upon the automotive vehicle, the cable is substantially taut, thereby preventing relative rotary movement between the coil and cover.

5. An extension lock-switch coil assembly for automotive use, comprising a switch unit mounted in the passenger compartment of the vehicle, a coil mounted at a remote position in the engine compartment of the vehicle, a cover for one end of the coil, and means including bayonet type provisions for securing the cover to the coil end by partial relative rotary movement; an armored electrical connection extending between the switch and coil and including a flexible armor permanently joined to the switch and cover, said armored connection being of such length as to just extend between the switch and coil and be so taut as to prevent relative rotation between the cover and coil so long as both the switch and coil are secured to their respective mountings.

6. A protective mounting for an ignition coil adapted to be attached to a support, comprising in combination, a coil housing; a detachable cover to close one end of the housing, said cover and housing having releasable coupling provisions cooperating with each other for normally preventing unauthorized removal of the cover from the housing, circuit connections for the coil including a terminal enclosed by the cover, means at a remote point for controlling the circuit connections, and a flexible armor extending from the controller to the cover, and thereby preventing release of the cover and housing coupling provisions so long as both the coil and controller are mounted in their designated positions.

7. A protective mounting for a container adapted to be attached upon a support, comprising in combination, a coil housing having an open end; a cover having a flange to fit around the open end of the housing; said cover and the housing end having releasable provisions for retaining the cover on the housing while united in a predetermined angular relation, a lock switch remotely located for controlling circuits through the coil, an armored conduit extending between the switch and cover and adapted to prevent unauthorized removal of the cover from the housing; and a bracket for attaching the container to the support, and means including said bracket for supporting the housing in that relation that prevent manipulation of the releasable provision thereby preventing reverse relative rotation of the housing and cover, so long as the coil is attached to the support.

LESLIE O. PARKER.