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COIL CONSTRUCTION

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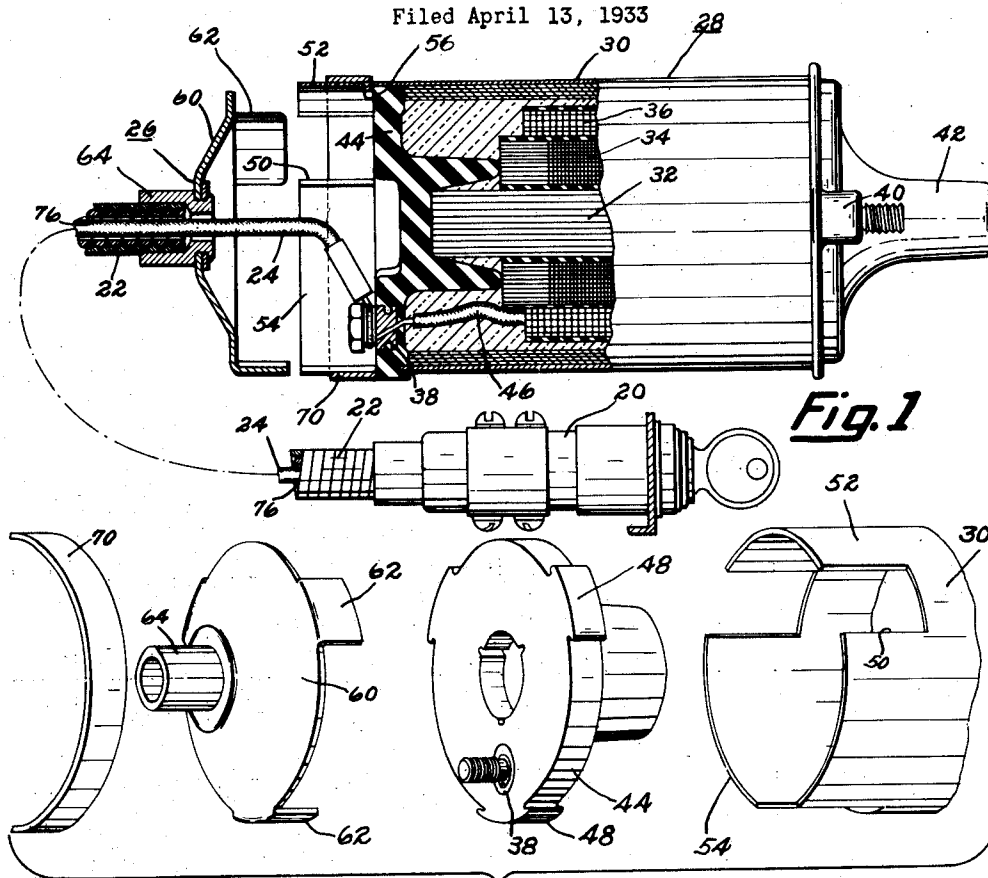


Fig. 1

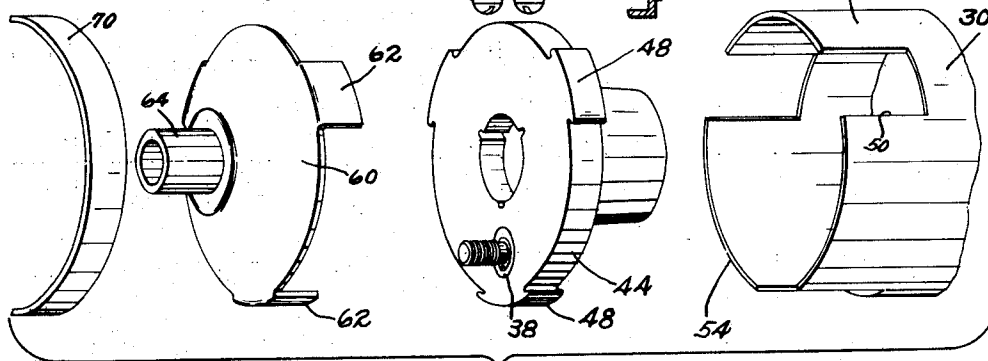


Fig. 2

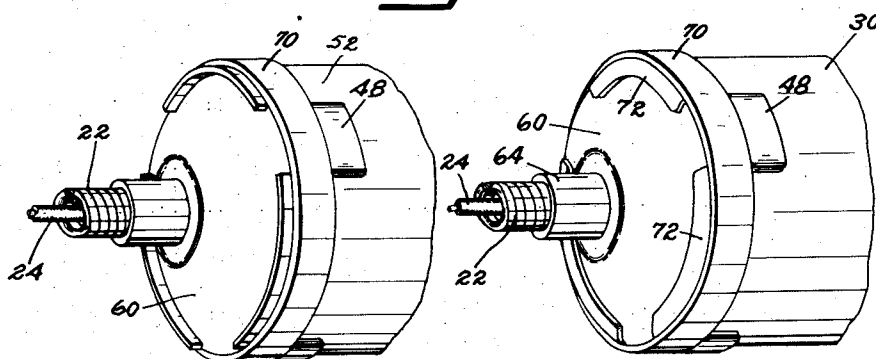


Fig. 3

Fig. 4

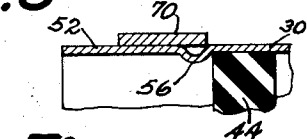


Fig. 5

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COIL CONSTRUCTION

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29 Claims. (Cl. 175—357)

This invention relates to ignition coils and is particularly directed to improvements of coils of the lock type, or of the lock switch type.

An object of this invention is to provide an ignition coil of the type described that is efficiently protected against unauthorized use and malicious tampering and so as to provide a theft resisting terminal chamber for enclosed electrical connections. This is accomplished by extending the coil housing beyond the terminal supporting means, and thence fitting a closure assembly within the extending portion where it is secured by an interrupted flange or the like.

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 one form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a view of the switch and coil assembly with certain parts thereof broken away and shown in section.

Fig. 2 is an exploded view of the coil and switch assembly illustrating the contributing parts in the order of their assembly.

Fig. 3 is a perspective view illustrating the coil and terminal chamber closure assembly prior to securing it in place.

Fig. 4 is a perspective view similar to Fig. 3, but illustrating the coil and the closure assembly in their final assembled relation.

Fig. 5 is a detail of construction.

With particular reference to the drawing, and as illustrated in Fig. 1, 20 indicates a lock switch controller provided with an extension unit 22 enclosing an electrical conductor 24 and provided with the closure assembly 26 adapted to be assembled and secured to the coil unit 28. While the lock switch controller unit 20, 22, 26 is illustrated as of the extension type, the disclosure presupposes and likewise is directed to a lock switch coil unit in which the controller and closure assembly are directly and rigidly secured together. Therefore, the description to follow, and the sub-joined claims are as fully applicable to the latter type as to the extension type of lock switch coil unit illustrated in Fig. 1.

The coil unit 28 in practically all instances includes a case 30 substantially enclosing a core element 32 about which is successively wound the wire of a secondary 34 and a primary 36, which windings have electrical connections with terminal members 38, 40 and 42 as is well known to those experienced in the art. In this particular instance the case member 30 carries a terminal

support 44 near one end thereof that insulatingly carries the terminal 38 and makes provision by means of the insulated wire 46 for connection with the windings 34 and 36 within the case 30. The terminal support 44 has the configuration as illustrated in Figs. 1 and 2, and is designed to provide lugs or extending portions 48 that are circumferentially spaced thereabout and designed to fit within notches 50 provided by an extension 52 from the case 30. This extended portion of the case 30 may be an integral part of the case, or it may be an additional member or members secured to the case 30, but in either event after it is notched as at 50, provides the circumferentially spaced webs 54 that extend throughout the space between the lugs 48 of the terminal support. These webs or extensions, after the terminal support has been moved into place provide means for holding the terminal support in position as by staking at 56 illustrated in detail in Fig. 5. The staking at 56 is a convenience rather than a necessity, and may be omitted if desired.

In the illustrated embodiment the closure assembly for the terminal chamber comprises a plate 60 of a contour to closely fit within the webs 54, and is provided with a plurality of tongues 62 so spaced circumferentially thereof as to be received by the notches 50 of the extensions from the case, and operate also when inserted into place to space the body of the plate 60 from the terminal support 44. The terminal plate 60 may be secured to the switch construction as is illustrated in Fig. 1, wherein a bushing 64 is secured thereto and is thence fastened to the flexible extension or conduit 22, or instead the plate 60 may be rigidly fixed to the lock switch controller in a well known or equivalent manner, and as disclosed in the prior art devices.

In assembling the lock switch coil unit, the two subassemblies are usually made up and thence joined together, the first subassembly including the ignition coil within the case 30 with the extended portion 52 substantially completing the terminal chamber, while the second subassembly comprises the switch with its lock and the closure assembly. The first subassembly usually also includes a band or ring or sleeve, or collar 70 as it is sometimes called, that is disposed about the notched end portion extending from the case 30. This band is preferably fastened to the extension as by welding, and when in position is designed to rest against the protruding portions 48 of the terminal support, and when in this position will cover a substantial portion or at least a part of the notches 50. Also when the closure member

is fitted within the extended portion of the case the tongues 62 of the plate will be covered by the band 70 which prevents their being ruptured or bent inwardly or outwardly so as to give access to the designedly protected terminal 38.

After the second subassembly has been united with the first subassembly, that is to say, after the parts are in the relation illustrated in Fig. 3, the extreme ends of the webs 52 are bent down or crimped against the plate member 60 to provide what may be called a mutilated flange 72, all as is illustrated in Fig. 4. When thus constructed, and with the conductor 24 secured to the terminal 38, the lock switch coil unit is complete and the terminal connection between the lock switch and the coil is protectedly enclosed within a relatively theft resisting chamber 76. This construction makes it relatively difficult if not practically impossible for the would-be thief to get access to the terminal connections of the coil, so as to recondition the vehicle for unauthorized use. Yet on failure of operation of either the lock switch or the coil, the assembly may be opened, with the use of properly designed tools, so as to provide the necessary repair or replacement, after which the parts may be reunited and the unit used as efficiently as ever.

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 lock coil switch unit, the combination comprising, a coil subassembly adapted to be united with a conduit support to provide a theft resisting terminal compartment, said subassembly comprising a casing, terminal supporting means supported within and near one end of said casing, said casing being notched at said end to receive radial extending portions of said terminal support, and a closure member carried by the conduit support and having tongues fitting within the notches of said casing, a band about the casing disposed over the notches and tongues, and means including the terminating edges of said casing portions between the slots for securing the conduit assembly to the coil subassembly.

2. In a coil and switch unit the combination of, a subassembly unit adapted to provide a coil and terminal chamber, said subassembly comprising a coil housing of tubular form having longitudinally extending slots extending in from one end thereof, a terminal support provided with radially extending lugs fitting within the slots so that the lugs extend through the slots of the casing, a band disposed about the slotted end of the casing and against the lugs of said terminal support, a closure assembly having lugs adapted to be disposed within the notches of said casing, means securing the casing to the closure assembly, and means including said band for protecting the terminal chamber thus provided from unauthorized access.

3. In a coil and switch unit the combination of a case having a notched end portion, a terminal support within the case located at the closed end of said notches, a closure member fitting within the case and having circumferentially spaced tongues fitting within said notches, means including the notched end portion of said case for securing the end closure thereto, and a band engaging the case to substantially cover the said notches and tongues.

4. In a switch coil unit, the combination comprising, a tubular case providing a coil housing and having notches extending longitudinally and part way in from one end of the case, a terminal support located near the base of said notches, a band about the notched end of the casing disposed over the notches, an end plate for closing the notched end of the casing, said end plate providing tongues to fit within the case notches and within the said band, and means including cooperating portions of the case and plate for securing the plate within the case against unauthorized removal.

5. In a switch coil unit, the combination comprising, a tubular case providing a coil housing and having notches extending longitudinally and part way in from one end of the case, a terminal support having portions disposed in said case notches, a band about the notched end of the case for substantially covering the notches, a conduit support assembly for closing the notched end of the case and including a plate, circumferentially spaced tongues on the plate fitting within the case notches, and means including a portion of the case for securing the plate within the case and for pressing the ends of the tongues against the portions of the terminal support extending through said notches.

6. In a switch coil unit, the combination comprising, a tubular case providing a coil housing and having notches extending longitudinally and part way in from one end of the case, a terminal support within the case separating the notched portion from the main portion of the casing, an end plate for closing the notched end of the casing, said plate providing tongues adapted to fit within the case notches, and a band about the notched end of the casing extending over a part at least of the notches and tongues.

7. In a switch coil unit the combination comprising, a tubular case providing a coil housing, a terminal support secured within the tubular case, means extending from the coil housing including circumferentially disposed webs with intervening notches, a plate fitting within said extending means and provided with tongues for disposition within said notches, means including said webs for securing the plate to the extensions, and a relatively heavy band covering at least a portion of said notches and tongues.

8. In a switch coil unit the combination comprising, a tubular case providing a coil housing, means extending from the housing to provide a substantial part of a terminal chamber and notched to provide arc like circumferentially spaced webs, a terminal support separating the terminal chamber and coil housing, a closure assembly for completing the terminal chamber, said assembly including a plate having circumferentially spaced tongues adapted to fit within said notches, means securing the plate within the housing extension, including portions of said webs bent against the outside of said plate, and a band extending over a portion at least of said notches and plate tongues.

9. In a switch coil unit the combination comprising, a tubular case providing a coil housing, means extending from the housing to provide a substantial part of a terminal chamber, a terminal support substantially separating the terminal chamber from the coil housing, means including staked portions of said extending means for locating said terminal support, a closure assembly for completing the terminal chamber and closely interfitted with said extended portion, means for

spacing the closure assembly from the terminal support, and means for securing the closure assembly in said spaced relation including portions of the extending means bent inwardly against the outside of the closure means.

10. In a switch coil unit the combination comprising, a tubular case providing a coil housing, means extending from the housing to provide a substantial part of a terminal chamber, a terminal support substantially separating the terminal chamber from the coil housing, means for locating the terminal support, a closure assembly for the terminal chamber, said assembly having provisions interfitted with the extending means including a part of the closure, means for spacing the closure assembly from the terminal support, and means including said housing extensions for securing the closure assembly to the coil housing.

11. In a coil and switch unit the combination of a case having a notched end portion, a terminal support within the case located at the closed end of said notches, a closure member fitting within the case and having circumferentially spaced tongues fitting within said notches, means including the notched end portion of said case for securing the end closure thereto, and for pressing the tongues against the terminal support, and a band engaging the case to substantially cover the said notches and tongues.

12. In a switch coil unit, the combination comprising, a coil housing, a terminal support attached to the housing, a collar attached to the housing and extending beyond the terminal support to provide a wall for a terminal chamber, a closure member for the terminal chamber, means extending from within the collar for securing the closure member in position, and means independent of the collar for spacing the closure member from the terminal supporting member.

13. In a switch coil unit, the combination comprising, a coil housing, a terminal support attached to the housing, a collar attached to the housing and extending beyond the terminal support to provide a wall for a terminal chamber, a closure member for the terminal chamber, means including thin sheet metal tongues extending from within the collar for securing the closure member in position, and means independent of the collar for spacing the closure member from the terminal supporting member.

14. In a switch coil unit, the combination comprising, a coil housing, a terminal support attached to the housing, a collar attached to the housing and extending beyond the terminal support to provide a wall for a terminal chamber, a closure member for the terminal chamber, means including thin sheet metal tongues extending from within the collar for securing the closure member in position, and means carried by the closure member for spacing the closure member from the terminal supporting member and for locating the closure member relative to said securing means.

15. In a switch coil unit, the combination comprising, a coil housing, a terminal support attached to the housing, a collar attached to the housing and extending beyond the terminal support to provide a wall for a terminal chamber, a closure member for the terminal chamber, means extending from within the collar for securing the closure member in position, and means carried by the closure member and engaging the terminal member for spacing the closure member from the terminal supporting member.

16. A subassembly unit adapted to be united

with parts of a switch device to provide a coil and switch assembly, said unit comprising, in combination, a tubular case providing a coil housing for enclosing a winding, a terminal support attached to the housing, a terminal connected with the said winding and insulatingly carried by said terminal support and adapted to make connection with said switch assembly, a collar attached to the housing and extending beyond the terminal support to provide a wall for the terminal chamber, and means extending from within the collar and adapted to secure as a closure for the terminal chamber a plate secured to the switching device.

17. A subassembly unit adapted to be united with parts of a switch device to provide a coil and switch assembly, said unit comprising, in combination, a tubular case providing a coil housing for enclosing a winding, a terminal support attached to the housing, a terminal connected with the said winding and insulatingly carried by said terminal support and adapted to make connection with the said switch assembly, a collar attached to the housing and extending beyond the terminal support to provide a wall for a terminal chamber, means including thin sheet metal tongues extending from within the collar adapted for securing a part of the switch device to complete the closure of the terminal chamber and means including a part of said extending means for locating the terminal support.

18. A subassembly unit adapted to be united with parts of an extension switch device having an armored connector to provide a coil and switch assembly, said unit comprising, in combination, a coil housing, a terminal support attached to the housing, a terminal carried by the support and connected with a winding within the coil housing, a collar attached to the housing and extending beyond the terminal support to provide a wall for the terminal chamber, relatively thin bendable means extending from within the collar and adapted to secure a part of the extension switch device as a closure for the terminal compartment.

19. A subassembly unit adapted to be united with parts of an extension switch device having an armor enclosing a flexible lead to provide a coil and switch assembly, said unit comprising, in combination, a coil housing, a terminal support attached to the housing, a terminal carried by the support and connected with a winding within the coil housing, a collar attached to the housing and extending beyond the terminal support to provide a wall for the terminal chamber, bendable means within the collar and extending therefrom adapted to secure as a closure for the terminal compartment a member which carries a flexible lead for the connection with said terminal.

20. A subassembly unit adapted to be united with a conduit supporting plate of a switching device to provide a coil and switch assembly, said unit comprising in combination, a coil housing, a terminal support attached to the housing, a terminal carried by the support and connected with a winding within the coil housing and adapted to be connected with an electrical lead enclosed by said conduit, a collar for the housing and extending beyond the terminal support to provide a wall for the terminal chamber, means within the collar and extending therefrom adapted to secure the conduit supporting plate as a closure for said terminal chamber.

21. In a switch coil unit the combination comprising, a tubular case providing a housing, a terminal support secured within the tubular case, and spaced a little from one end thereof, a plate fitting within the open end of the case and provided with tongues engageable with the terminal support, and means including a part of the case wall for securing the plate within the case. 80
22. In an extension lock switch coil unit the combination comprising, a tubular case providing a housing, a terminal support situated near one end of the case to provide a terminal chamber, a conductive element carried by the partition and adapted to be connected with conductors on either side of the partition, a conduit support including a plate for closing the terminal compartment, means including tongues of integral formation with the plate for spacing the plate from the terminal support, and means including deformed portions of the case for securing the conduit support to the case. 85
23. In an extension lock switch coil unit the combination comprising, a tubular case providing a housing, a partition dividing the case into a plurality of chambers, one being a terminal compartment near an open end of the case, a conductive element carried by the partition and adapted to be connected with conductors on either side of the partition, means provided by the case for locating the partition, a conduit support including a plate for closing the terminal compartment, means including tongues of integral formation with the plate for spacing the plate from the partition, and means including deformed portions of the case for securing the conduit support to the case. 90
24. A subassembly unit adapted to be united with a switching device including a plate carrying spacing means to provide a coil and switch assembly, said unit comprising in combination, a tubular housing having flange portions, a terminal support situated within the housing so as to provide a chamber at one end of the housing, an electrically conductive member supported by the terminal support in insulated relation to the housing, a collar surrounding the housing and extending beyond the terminal support, and means including the flange portions adapted to be bent against the plate to secure the plate adjacent the collar and for closing the terminal chamber, the spacing means of the plate being clamped against the terminal support. 95
25. A subassembly unit adapted to be united with a switching device including a plate carrying spacing means to provide a coil and switch assembly, said unit comprising in combination, a tubular housing having interrupted flange portions, a terminal support situated within the housing so as to provide a chamber at one end of the housing, an electrically conductive member supported by the terminal support in insulated relation to the housing, a collar surrounding the housing and extending beyond the terminal support, means including the interrupted flange portions adapted to mate with the plate and to be bent against the plate for securing the plate as a closure for the chamber, said tongues of the plate being clamped against the terminal support. 100
26. A subassembly unit adapted to be united with a switching device including a plate having spacing tongues to provide a coil and switch assembly, said unit comprising in combination, a tubular housing having interrupted flange portions, a terminal support situated within the housing so as to provide a chamber at one end of the housing, an electrically conductive member supported by the terminal support in insulated relation to the housing, and means including the interrupted flange portions adapted to mate with the plate and to be bent against the plate for securing the plate as a closure for the chamber, said tongues of the plate being clamped against the terminal support. 105
27. In a switch coil unit, the combination comprising, a housing, a partition near one end of the housing and providing one wall of a terminal chamber, a conductive element supported in insulated relation by the partition, and adapted for connection with elements on either side of the partition, means including parts of the casing for locating the partition, a conduit support including a plate for closing the terminal chamber, means including circumferentially spaced tongues of the plate for spacing the partition and plate, and means including deformed portions of the housing flange for securing the conduit assembly in closed relation to the case. 110
28. In an extension lock switch coil of the class wherein a flexible lead is electrically connected to a switch part, and is enclosed by an armor and plate, the combination of, a subassembly unit adapted to be united with said plate and lead comprising, a casing, a partition supported within and near one end of the casing, a conductive element insulatedly supported by the partition and adapted for connection with said lead, a collar surrounding the casing and extending to one side of the partition, and means extending from within the collar and including circumferentially disposed webs interrupted by notches adapted to receive the plate and secure the same in closed relation to the casing. 115
29. A subassembly unit adapted to be united with a conduit supporting plate of a switching device to provide a coil and switch assembly, said unit comprising in combination, a tubular case providing a coil housing, means extending from the housing to provide a substantial part of a terminal chamber, a terminal support carried by the housing, means including depressed portions of the housing extension for locating the terminal support, a conductive element carried by the support and adapted to be connected with an electrical lead enclosed by the conduit, and means including portions of the extending means adapted to secure the conduit supporting plate as a closure for the terminal chamber. 120

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