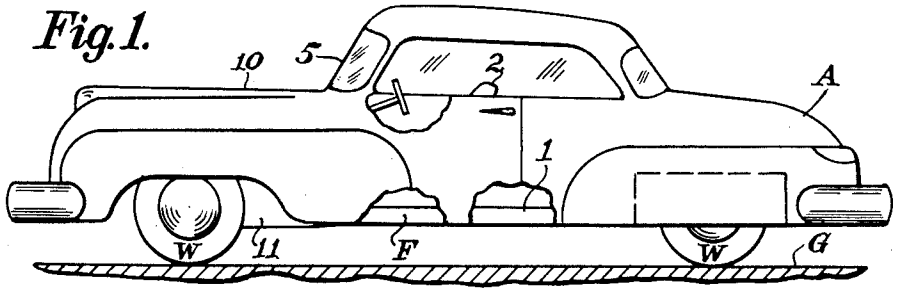
Oct. 23, 1956 J. R. DURNIN 2,768,311

SEALED AUTOMOBILE SAFETY SWITCH

Filed Feb. 19, 1953 3 Sheets-Sheet 1

Fig. 1.



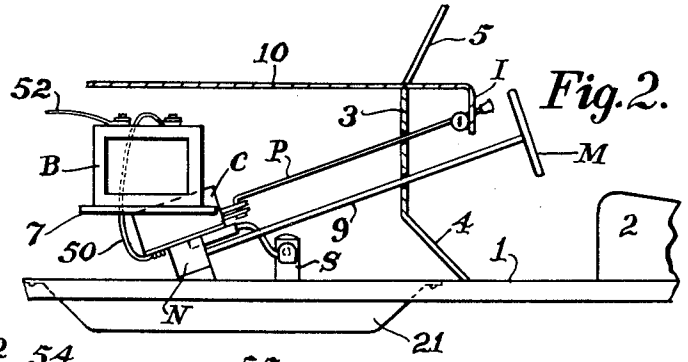


Fig. 2.

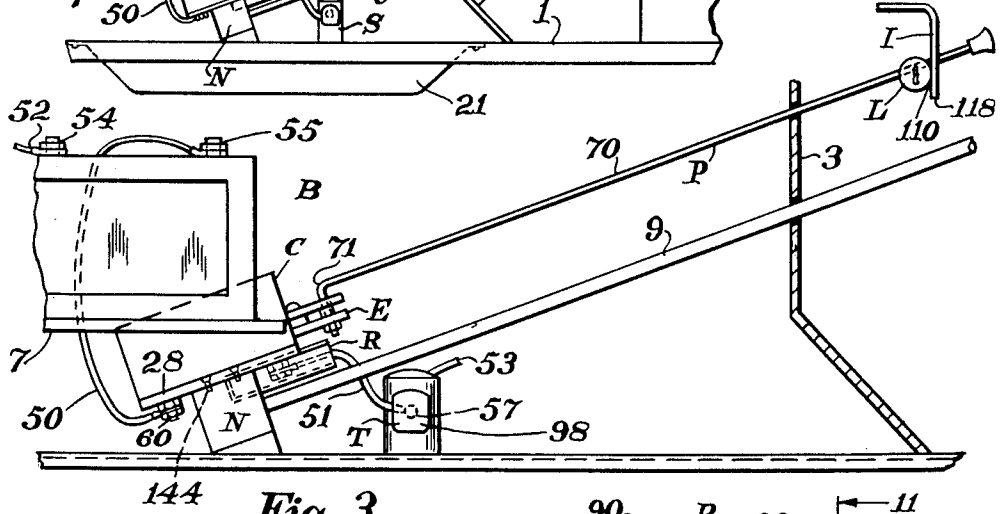
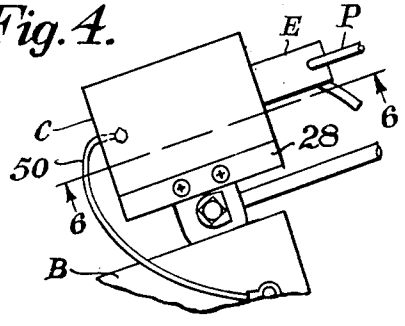


Fig. 3.

Fig. 4.



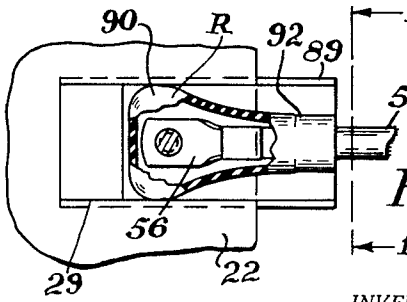


Fig. 5.

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SEALED AUTOMOBILE SAFETY SWITCH

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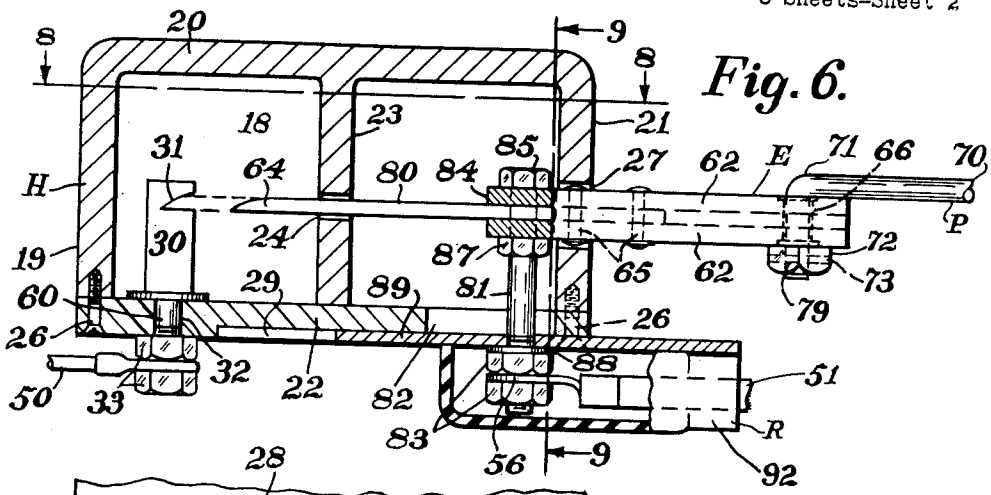


Fig. 6.

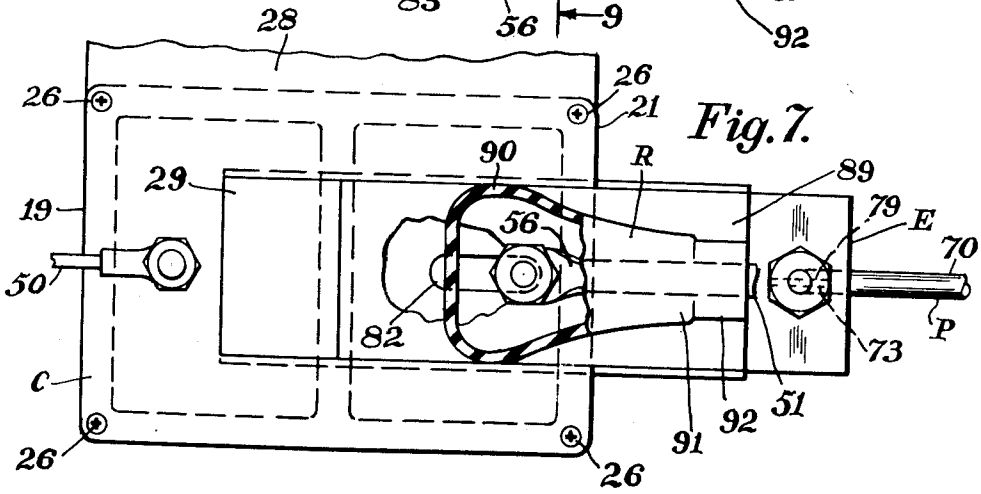


Fig. 7.

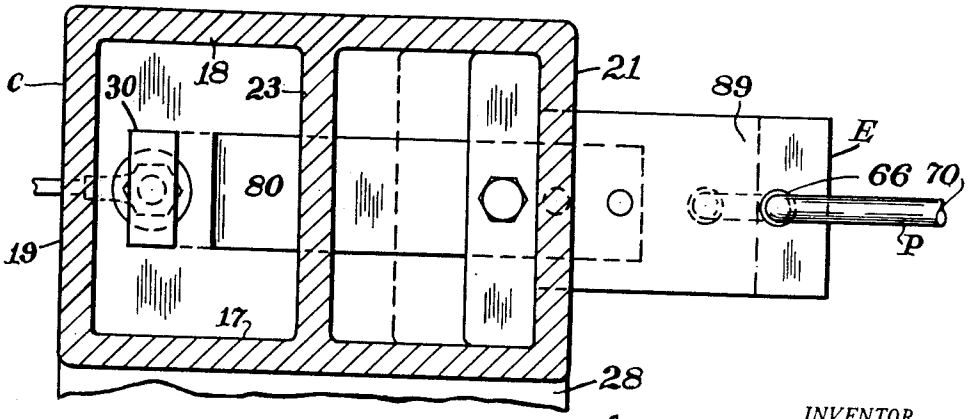


Fig. 8.

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SEALED AUTOMOBILE SAFETY SWITCH

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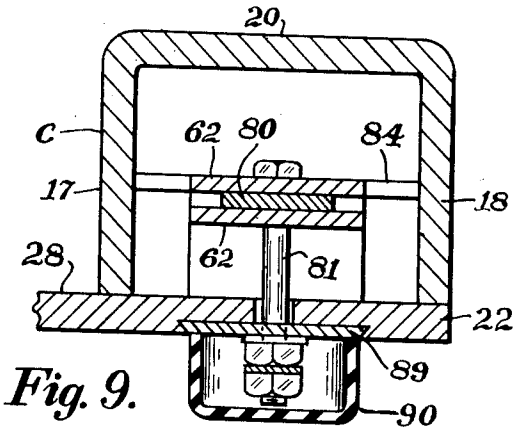


Fig. 9.

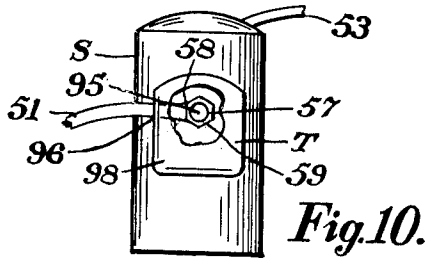


Fig.10.

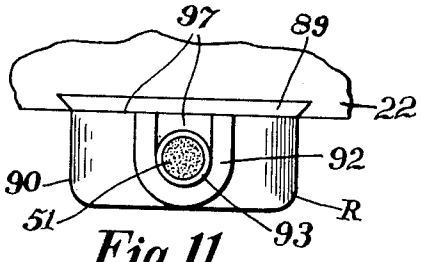


Fig.11.

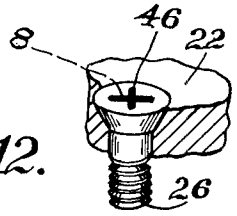


Fig.12.

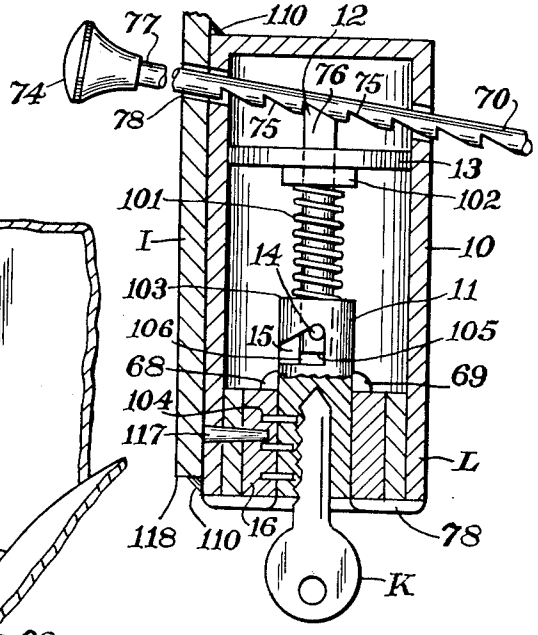


Fig.14.

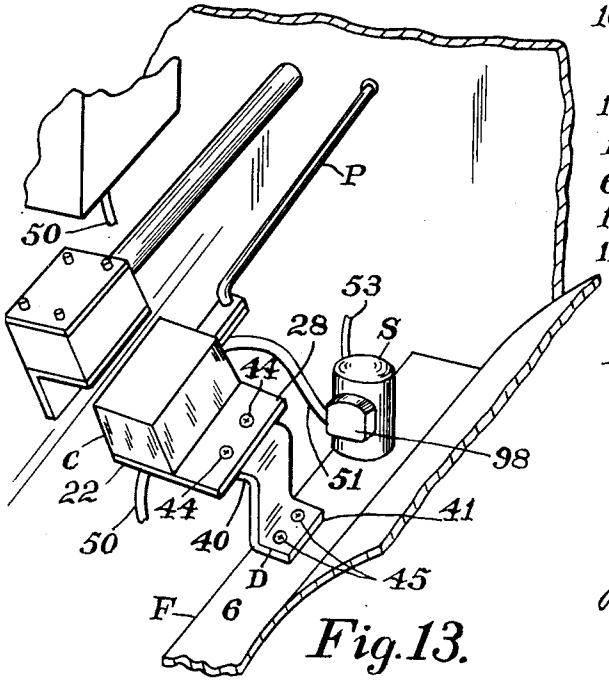


Fig.13.

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2,768,311

SEALED AUTOMOBILE SAFETY SWITCH

Joseph R. Durnin, Haverhill, Mass.

Application February 19, 1953, Serial No. 337,836

5 Claims. (Cl. 307—10)

This invention relates to an electrical safety device for motor vehicles and more particularly to automobiles as distinguished from trucks. The main purpose of the device is to so position and attach a sealed safety make and break cutout switch inside a specially made two part switch box between the battery and the solenoid switch or starter solenoid that closing the switch, as for stealing a car, is very difficult except at a machine shop by using power driven tools or by first releasing a locked operating rod which extends through the instrument panel.

In this type of automobile, the solenoid switch is now connected to the battery by a single conductor, but I interpose my sealed switch in that connection and so make it that the switch can only be operated by a rigid, straight, case hardened steel rod which at one end connects directly with a projecting slide member of a slidable switch arm assembly. The slide member or actuating arm, carries a male contact member, or a switch contact arm, inside the box as well as a contact post which extends downward through the bottom of the box housing and connects with the cable to the solenoid switch. Also provided is another stationary female contact in the box with a post extending through the bottom of the switch box which post connects with one pole of a battery, the other pole of which is grounded in the usual way.

The special purpose of this device is to locate such a sealed make and break switch in its box in a location and in a manner which will make it very difficult for a thief or any unauthorized person to close the circuit through the switch or to entirely remove it so that the direct connection between the battery and the solenoid switch can be made and so that while the rigid operating rod can pass in a substantially straight direction through the dash and instrument panel in its usual position below the windshield, it can be operated by the driver to open the switch, which is then automatically locked, without a key. The rod can then be released by the driver with a key in a spring type lock in such a position below or behind the instrument panel that any unauthorized person cannot, without the use of extraordinary force, release the rod from the lock in order to close the switch and start the car.

When using the word "fixed" in this specification it is intended to distinguish from the word "removable." Fixed is intended to mean riveting, welding or the use of certain types of metal screws, the heads of which are so made that they require a special type of wrench, as distinguished from those with slotted heads which can be removed by a screwdriver, or polygonal heads which can be removed by an adjustable flat jawed wrench known as a monkey wrench or those having projecting ends or heads which can be turned by a Stillson wrench.

I will call such screws "fixed screws" and they are preferably counter-sunk and such a screw may have a slot in its head which slot is sealed by molten metal. I also use "fixed" to parts which are fastened in place by the use of an adhesive.

This type of automobile usually has a chassis or frame

usually formed of channel irons or beams or angle shaped irons. The frame is carried by wheels between which and the frame are springs or shock absorbers, while the body has at the front a radiator, then a power plant including an engine of the explosive type with a battery, generator and electric circuits and connections among which is what is known as a solenoid switch or starting switch directly connected to the battery. All these are located under a hood which extends back to a dash below the windshield there being also an instrument panel extending back and down from the frame between the end of the hood and the windshield. Also extending down and back from the bottom of the dash is a foot board and from that, the floor of a car which supports a seat for the driver. Between the seat and the dash is a steering wheel and steering post which extends down to a point where there is a gear box for steering.

The particular new features of my device are the provision of a switch attached to some rigid metal part of the body by a bracket or part of a bottom member of the switch housing, this housing being preferably made of insulating material such as a suitable plastic attached to the body by a special type of screws known in the trade as fixed screws or by suitable bolts. This bottom member supports a one piece integral cover made of similar plastic material with a top, sides and ends, this cover being also attached to the bottom by suitable screws or bolts.

This cover also preferably includes an integral transverse or crosswise partition with a guide passage between the sides, top and bottom.

Besides serving as a theft preventing or delaying device, my sealed switch is of great value in preventing fires caused by heating of electric wires, as the operator by opening my automatically locking switch if a fire starts, or when he leaves his car parked, cuts off the battery current.

The operator can merely pull on the knob of the operating rod thus opening the switch to break the battery circuit and also keeping it open until his key is used in the dashboard lock.

The term "cable" is used herein to mean a conductor that is heavily insulated with tough but somewhat flexible material.

In the drawings,

Fig. 1 is a side elevational view of an automobile with its wheels resting on the ground, the automobile being of the type in which my device is located.

Fig. 2 is a side elevational detail view showing the principal parts of my device in their most approved position.

Fig. 3 is a view similar to Fig. 2 of such parts but on a somewhat larger scale.

Fig. 4 is a plan view of my sealed safety switch attached in the position shown in Figs. 2 and 3.

Fig. 5 is a bottom view of a part of my safety switch showing the slide for its movable post and with its seal in place.

Fig. 6 is a sectional view of my sealed safety switch as on the line **6—6** of Fig. 4 but on a much larger scale.

Fig. 7 is a bottom view of the switch shown in Fig. 6.

Fig. 8 is a sectional view on line **8—8** of Fig. 6.

Fig. 9 is a sectional view on line **9—9** of Fig. 6.

Fig. 10 is a back elevational view of the cap seal on the solenoid switch.

Fig. 11 is a sectional view on line **11—11** of Fig. 5.

Fig. 12 is an isometric view of one type of fixed screw.

Fig. 13 is an isometric view of my switch attached to a bracket fastened to the automobile frame with the battery and other parts indicated as in positions different from Figs. 2 and 3.

Fig. 14 is a detail sectional view of a lock and with parts of the push and pull rod and dash.

In the drawings, A represents an automobile of the usual type which is made up of wheels indicated by W and a frame F which is so suspended on the wheels that its frame F or chassis is so close to the ground that it is difficult for an unauthorized person to operate underneath, especially if there is a floor 1 and underneath it a drip pan 11.

2 represents a seat, 3 a dash, 4 the usual foot board, 5 a windshield below which and near the back of the hood 10 is an instrument panel I on which are certain of the controlling devices such as for lights, starter, and others.

M is the steering wheel, 9 is the steering column and N is the gear box or housing which is usually below the battery B.

B represents a battery which as is customary in up to date cars, is supported on a plate 7 shown in some of the views.

S is what is known as a solenoid or starter switch of a well known type and C is my safety switch which is interposed between the battery B and the solenoid switch S and is shown as supported by gear box N or by a bracket, and as including an operating member E which is connected with and includes a slidable contact 80 inside of switch C and a post 81 which extends through the bottom plate 22 of switch C.

P is a pull and push rod which is in extension of member E for my switch C all substantially parallel with steering column 9.

R and T are seals, or shields made of insulating plastic.

This operating member E is fixed to one end of a pull and push rod P which extends in a relatively straight line up through the dash and instrument panel and can be locked in position by a lock L, below and behind the instrument panel I by a key K.

The lock and key may be of various types but of such a kind that when the rod P is pulled out, the circuit is broken between the ground, the battery and the solenoid switch. The car is, therefore, made immovable by power from the engine which is of the usual explosive type with electric ignition.

The part of the circuit as shown extends from the ground through wire 52 to battery post 54 thence through the battery B to post 55 and from there by wire 50 to a post 60 forming part of the fixed contact 30 inside of safety switch C, and when this switch is closed, the current continues through slidable contact 80 and outside post 81 by cable 51 to a post or other suitable fixed connection 57 of the solenoid switch S from which switch by wire or conductor 53, it connects with the other devices forming part of the electric wiring assembly for the usual up to date automobile, Figs. 2, 3 and 4.

The sealed safety switch C includes a bottom plate 22 which is shown as having an extension 28 through which it is attached to gear box N or to a bracket and a cover H which includes a top 20, sides 17 and 18, one end 19, all of which are imperforate, and another end 21 through which is an operating member guide slot 27. See Figs. 6, 7, 8.

There is also a transverse partition 23 through which is an operating member conductor guide passage 24 in line with the slot 27 so that the operating member E can slide in and out to make and break the circuit through fixed contact 30 with a V slot 31. See Fig. 6.

The entire top H, including the partition 23 is preferably made in one piece, as a casting or formed by means of dies, of a very tough plastic of insulating material and which is so tough and hard as to resist breaking by an ordinary hammer or rock and of a material which will resist chiseling, sawing, cutting, boring or filing so that getting inside the top, sides, ends or bottom plate, especially when it is located in a position where it is very hard to get at, to close the switch is difficult.

The top H preferably is attached to the bottom 22 by

means of what are known as fixed screws 26, 26 as indicated in Fig. 6. These screws are formed with a polygonal recess, in their exposed end or head. When the parts are screwed together, we prefer to fill this recess 8 with solder 46, see Fig. 12, so that the screw cannot be unscrewed with any wrench and cannot be removed except by some special grinding tool.

Inside the switch C and fixed to the bottom 22 is a fixed contact 30 with a V slot 31 to engage a conductor 64 forming part of a slidable contact 80 and operating member E.

My sealed safety switch C and seals R and T are made of a plastic such as Amberlite, Amberloyd or Viscoloid.

32 is a post hole for a post 60 to which wire 50 to battery B is fixed, the wire as shown being fastened in place as by nuts 33, 33. The thread on the end of post 60 is preferably upset or injured so that the nuts cannot be removed to disconnect this wire, although it would do no harm if either ground wire 52 or wire 50 was disconnected because the circuit would still be kept open inside the sealed safety switch C.

80 represents a slidable contact which includes a post 81 which extends down through a slidable post slot 82 in bottom plate 22. This post extends down below and outside and one end of wire or cable 51 is fastened to it by nuts 83, 83. The other end of cable 51 is fixed to solenoid S at 57.

There is a cover plate, slot 29 in the bottom plate 22 in which is a slideable cover plate 89 attached to and supporting post 81 so that tamperers, dirt and dust cannot get inside of the safety switch through the slidable post slot 82. See Figs. 5, 6, 7, 9.

The other parts of the operating member E besides slidable contact 80 includes a conductor 64 which goes through the operating member guide passage 24 and is held between the top and bottom plates 62, 62 of insulating material, both of which pass through the operating member guide slot 27 in end 21, these being held together as by rivets 65, 65 and there is also a hole 66 by which it is attached to pull and push rod P.

As shown, there is a guide plate 84 and nuts 85 and 87 at the inner end of post 81 to guide member E between the sides 17 and 18 of cover H, to hold conductor 64 in place as part of contact 80 and member E, and to act as a stop therefor and for rod P.

The pull and push rod P has a straight shank 70 of very hard metal such as tool steel bent at its front end 71 to go through hole 66 in member E. End 71 is threaded at its tip and then fixed in place by means of a nut 72, through a hole 79 in which is driven a pin 73. The tip of end 71 might be upset or held fixedly in place by some other means.

Shank 70 goes through a lock L and hole 78 in instrument panel I and its back end 77 is threaded to engage the threads in an operating knob 74, Fig. 14.

Shank 70 also has notches 75, 75 any one of which can be engaged by a bolt 76 of a lock L or by tumblers in such lock. In every case, rod P is releasable by a key K in the lock L, which is of the spring type and of the strongest construction to resist breaking or manipulating by any one to release the rod P and close sealed switch C.

The extension 28 of switch bottom 22 is fixed to gear box N by means of fixed screws 144, 144, and is therefore at about the same angle as the steering column 9, Figs. 3 and 4.

Instead of being fixed to gear box N, my sealed switch C can be fixed to an arm 40 of a bracket D by fixed screws 44, 44 passing through extension 28 of bottom plate 22. The leg 41 can be fastened by fixed screws 45, 45 to any part such as 6 of frame F.

In every case, the safety switch C should be positioned at a slight slope so that operating member E and push and pull rod P will extend in the same straight line, whereby the rod to be released to close the switch must not

only be unlocked, but must be pushed in to engage the inside contacts **80** and **30**.

It is important that the metal conducting parts of slidable contact **80** including post **81**, friction washer **88** and nuts **83, 83** and also the contact end plate **56** of cable **51** held between nuts **83, 83** should be sealed and insulated.

As shown in Figs. 5, 6, 7, 9 and 11, this is done by means of an insulating seal R of plastic or other tough insulating material having a hollow head **90** to go over the parts **81, 83, 83, 88** and **56**, a flat neck **91** cemented to slide **89** and a semi-annular collar **92** which partly surrounds the insulation **93** of wire or cable **51** and which is preferably attached to slide **89** by cement **97** and may also be cemented to insulation **93**, Fig. 11.

Seal R, therefore, moves with slide **89**, extension E and rod P and one end of cable **51** also moves with them.

As the solenoid switch S is usually of metal made as a cylinder, a somewhat differently shaped seal T of similar material to R is cemented to S in the form of a cap **98** to cover and to insulate and protect its metal conductive parts such as post **95**, the end plate **58** and nut **59** as shown in Fig. 10.

Cap seal T has an opening **96** through which the insulation **93** or cable **51** passes with a close fit and preferably it is cemented in place and to seal opening **96**.

Insulating seals R and T are preferably cemented in place after the end plates **56** and **58** have been attached.

Cable **51** is the vital connection between my switch C and solenoid switch S and it must be protected electrically by a thick, tough covering of insulating material such as must also be used for seals R and T.

My switch is interposed in this vital connection in a position, preferably on the gear box which is below the battery and the solenoid switch and in a very inaccessible part of the mechanism, the connections for my switch being preferably underneath and consisting of a stationary female contact with a post which extends down through the bottom and connects with the non-grounded pole of the battery there being also a slidable male contact which has a post extending down through a slot in the bottom of the switch, this post being connected to the solenoid switch by a cable, both ends of which, one at the slidable switch post and the other at the stationary solenoid post, are completely sealed and protected by the seals R and T.

As the battery B is in different locations in different cars and the gear box N may be obstructed by wires and other parts, the wire **50** is preferably a cable and the safety switch C may be on a bracket D.

The bracket such as D can be made of any suitable form for any particular arrangement of any car or type of car on which it is to be used, and if a splash pan such as **21** is used, switch C is preferably in such a location that this pan will be between the switch and the ground. See Fig. 13.

The battery and solenoid may be in any convenient location preferably near each other and the safety switch between is preferably in any position which is low and difficult to reach under.

The lock L is welded at **110** to instrument panel I and may be of a well known Yale or cylinder type with a tubular barrel **10** in which a plug **11** is turnable and not slidable with a bolt **76** having a tooth **12**, the bolt being normally pressed by a spring to engage one of the notches **75** in rod P to allow the rod to be pulled outward but not to be pushed inward until the plug and its bolt are released from a notch by the use of a key K in a well known way to release the bolt **76** with its bevelled end or tooth **12** from a complementary bevelled notch **75** cut in the rod P.

The parts of lock L are so arranged that when the rod is pulled away from switch C to open that switch, it is automatically locked by the spring bolt **76** but when the tooth **12** of the bolt is released by the key K, rod P must also be pushed in and be free to be pulled out by the operator to lock the car without using the key.

Several types of locks can be used, but I prefer the one

shown in Fig. 14 in which the bolt **76** of lock L is square at its tooth end **12** and where it passes through fixed guide **13** but it is round between its collar **102** and its other end **105** which enters into hole **106** in plug **11** in which it is slidable but not turnable.

16 is a holder for pins **104** and is fixed to barrel **10** as by a pin **117** which prevents it from turning or sliding and it may also be welded to barrel **10** while **68** and **69** are stops on plug **11** which allow it to be turned but not to be pulled out.

Compression spring **101** between collar **102** and the end **103** of plug **11** normally keeps end **12** in contact with rod P so that it will engage a notch **75** when rod P is pulled out but will prevent rod from being pushed back to close switch C.

Tumblers or pins **104** in barrel **10** normally keep plug **11** from turning until disengaged by key K in a well known way and as plug **11** is provided with a triangular slot **15** into which a pin **14** fixed to bolt **76** enters, when the key K and plug **11** are turned to the right, pin **14** pulls the end **12** of plug **76** out of a notch **75** so that rod P can be pushed in thus closing my switch C.

In assembling my complete device the safety switch with top H and bottom **22** with the contacts and operating member in place inside may also be connected to the push and pull rod P as described, but without the operating knob **74**.

End **77** of rod P can be pushed through hole **78** in panel I or rod P can be attached to member E afterwards.

Cable **51** is connected to post **81** of my switch and sealed by seal R.

Cable **51** is connected and fixed to the post **57** of solenoid S and the connection is then sealed as by seal T.

The sealing material and the material for switch top H and bottom **22** may be cellulose nitrate, pyroxylyn, cellulose propionate, Bakelite polystyrene, glass bonded mica or other similar plastics.

All the parts of sealed switch C are fixed together and if one is used, to bracket D so that the posts of the safety switch C will extend downward preferably below the battery B on gear box N or below an arm of the bracket D before the bracket is attached to the frame, as fastening to the frame is the last step in the process of sealing the parts in place. The switch C, alone or on bracket D, is fixed in the most difficult available position for anyone to reach so as to operate on with ordinary hand tools such as wrenches, chisels, saws, hammers.

The fundamental idea of this device is to interpose in a vital part of the circuit between the ground, one pole of the battery, through the battery, through the other pole and from there hrough a cable which connects with a solenoid switch from which other wires extend. My switch is interposed in this vital cable connection **51** between the battery and the solenoid switch.

The ground wire **52**, its post **54** and the other post **55** of the battery need not be protected as no harm is done if the wire **50** between battery B and my switch C is entirely taken off and replaced by another, but the other post **81** of my switch C at one end of cable **51** must be well protected by the seal R and the same is true of the post or other device **57** of the solenoid switch S at the other end of cable **51** by seal T.

If the posts **81** and **57**, cable **51** and all its terminals as in my device are protected by insulation, preferably waterproof, fireproof and so tough that they are difficult even to saw through, and the rod P and lock L are of such a character that when switch C is once opened, it cannot be closed without the use of a key, while it may be possible to cut other wires or to pick the lock, that is exceedingly difficult.

As shown in Figs. 2 and 3, the key end **78** of barrel **10** of a lock L can be at the right or left, the lock being in a horizontal position transversely with no part showing below the bottom run **118** of panel I, but I prefer to position the lock L vertically as shown in Fig. 14 with the key

end 78 just showing below run 118 so that it is easier for the driver to locate it but not easier for a thief to locate or to remove it.

I may or may not use a seal such as R or T over either post 54 or 55 or over both, but this is not essential and other shapes and types of seals may be used at the terminals of cable 51.

I claim:

1. In an internal combustion vehicle, tamper resistant, power cut off mechanism, said mechanism comprising a sealed, immovable, cut off switch housing of rigid, non conductive material having a contact post hole and a contact post slot in the bottom thereof and an actuating arm passage in a wall thereof; a slidable switch arm assembly including a rigid switch contact arm of conductive material within said housing, a first rigid contact post of conductive material, supported by a cover plate, slidably fitting said slot and extending out of and below said contact post slot and an actuating arm of rigid non conductive material extending out of, and closely, slidably fitting said actuating arm passage; a second rigid contact post of conductive material, fixed in and entirely filling said contact post hole and having a portion within said housing in the path of said switch contact arm and a portion extending below and outside said contact post hole; a conductor connecting the exterior portion of said second rigid contact post to a source of current; a conductor cable, encircled by tough insulation, connecting the exterior portion of said first contact post to a solenoid switch terminal of the vehicle starter; a pair of shields of tough non conductive material, each mounted around an opposite end of said cable, one said shield covering the cable connection to the first contact post and the other said shield covering the cable connection to the solenoid switch terminal; a bracket for mounting said cut off switch housing with the bottom thereof facing the floor of the motor compartment and at a level just above the level of said floor; a straight rod, forming a rigid axially aligned extension to said actuating arm, said rod extending into the driver compartment and terminating at the instrument panel, and a key operated lock mounted on the instrument panel but encircling said rod, for controlling the movement of the rod.

2. In an automobile of the type having a power cut off switch between the battery and the starter the combination of a said housing being sealed except for a side wall having a passage and a bottom wall having an elongated slot housing for said switch; bracket means for mounting said housing just above the floor of the automobile motor compartment with the housing bottom facing downwardly; a cover plate slideably covering said elongated slot and supporting a movable contact arm and a post of said switch said post extending through the bottom of said housing; a cable encircled by tough insulation, connecting said contact post with a terminal of the starter; a pair of shields, one shield covering the cable connection to said switch contact post and the other said shield covering the cable connection to said starter and slideable switch actuation means, including a rigid actuating arm closely fitting, and slideable in, a passage in a wall of the housing and rigidly connected to said cover plate, contact post and contact arm for moving the same from outside said housing to actuate the switch within the housing.

3. A combination as specified in claim 2 wherein said slideable switch actuation means includes a rigid rod in fixed extension of said actuating arm and terminating in the driver's compartment of said automobile.

4. A safety switch for automobiles adapted to be supported by and fixed to the automobile frame between the automobile starter solenoid switch and the automobile battery, said switch including, a bottom plate of insulating material on said housing, said plate supporting a fixed contact post also extending therebelow and including an elongated contact post slot for a movable contact post; a one piece housing cover of insulating material fixed to the bottom plate and enclosing said switch, said cover having a transverse partition pierced with an inner elongated guide passage and an end wall, parallel to said partition, pierced with a registering outer guide passage; a switch actuating member closely fitting and slideable in said outer guide passage, said member having a slideable switch contact arm slideable in said inner guide passage adapted to engage the portion of said fixed upstanding contact post within said housing and having a contact post extending through said contact post slot and movable with said member; a conductor, covered with tough insulation, attached to said movable contact post and adapted to connect the same with the automobile starter; a shield, including a cover plate supporting the movable contact post and slideable in a groove in said housing bottom said plate completely covering the elongated slot for said movable post in said bottom and said shield extending entirely around the adjacent end of said conductor to prevent access to the cable connection to said movable contact post, and locking means, operatively connected to said switch actuating member, for locking said member against sliding movement in said outer guide passage.

5. A safety switch for automobiles, said switch comprising a hollow housing of rigid imperforate, non-conductive, material, said housing having a side wall with a passage and a bottom wall with an aperture and an elongated slot; an immovable switch contact post fixed in, and entirely filling said aperture, said post having a contact point within said housing and a terminal outside said housing; a slideably movable switch contact assembly, said assembly including a cover plate slideably mounted to cover said slot, a switch contact post supported by said plate and having a terminal outside said housing and a contact arm within said housing adapted to engage the contact point of said fixed contact post and an actuating arm of rigid, non-conductive material fixed to said movable switch contact assembly within said housing, said actuating arm being slideable in, and substantially filling, said passage and extending outside said housing for opening and closing said switch without permitting access to the interior of said housing.

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