Sept. 25, 1934. J. P. GERAGHTY 1,974,488

SAFETY DEVICE FOR INTERNAL COMBUSTION ENGINES

Original Filed June 23, 1931

Fig. 1.

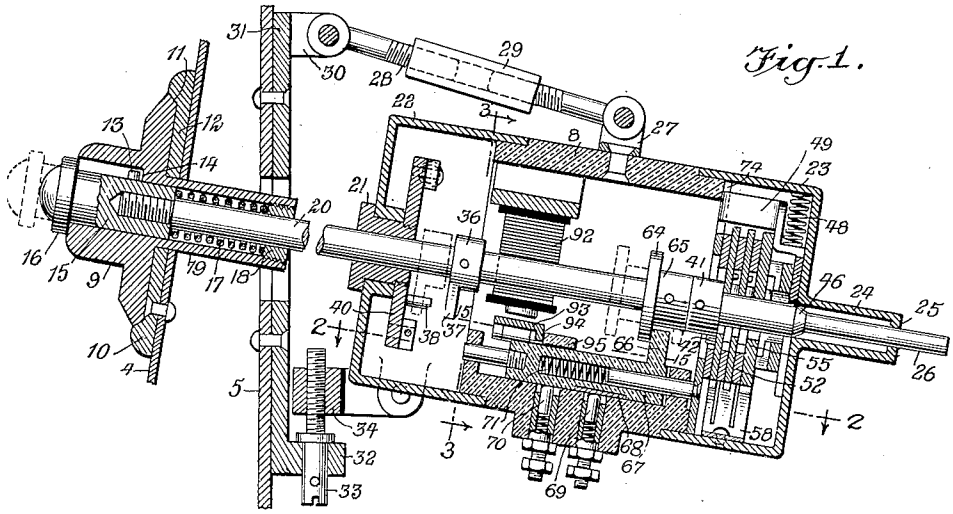
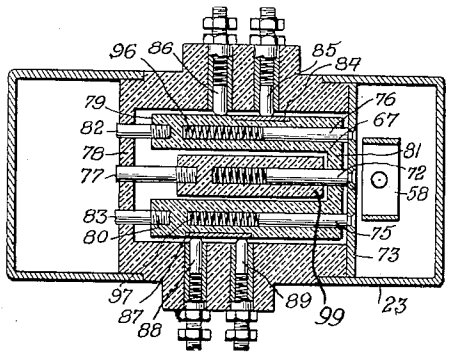


Fig. 2.



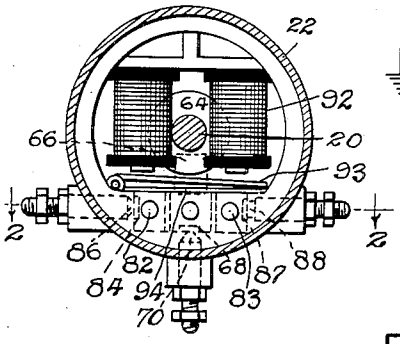


Fig. 3.

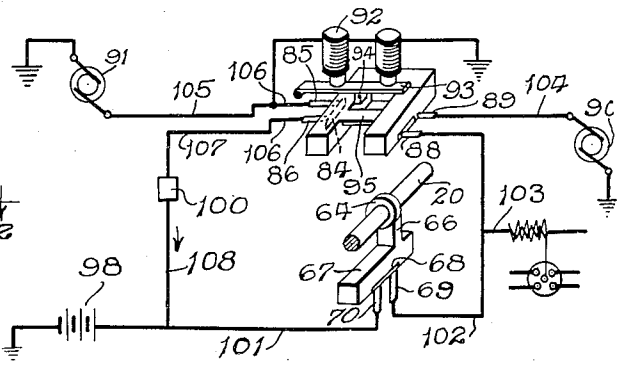


Fig. 4.

WITNESSES

George Naylor

A. L. Kitchin

INVENTOR

John P. Geraghty

BY Munn & Co.

ATTORNEYS

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SAFETY DEVICE FOR INTERNAL COMBUSTION ENGINES

John P. Geraghty, Jersey City, N. J.; John G. Flanigan executor of said John P. Geraghty, deceased

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5 Claims. (Cl. 200—106)

This invention relates to safety devices for engines, and particularly to an improved safety device for internal combustion engines used on automobiles, the object being to provide a complete structure wherein by an operation of a single member, the hood of the automobile may be locked or unlocked and the ignition and starter circuits opened or closed.

Another object of the invention is to provide an improved safety device for automobile engines, wherein a combination lock is associated with a number of other parts in such a manner that the ignition is locked open when the engine is standing still and when the lock is actuated to an inoperative position, the ignition circuit is closed as well as the starter circuit so that the engine will immediately begin to function.

A further object of the invention is to provide an improved suspension for the combination lock and various switches associated therewith, the suspension being such that it will permit different parts to be arranged at different angles according to the angle of the instrument board.

A still further object of the invention is to provide an improvement over my prior patents, Nos. 1,592,763; 1,598,572 and 1,511,119.

In the drawing—

Figure 1 is a longitudinal, vertical, sectional view through a switch and associated parts illustrating the invention as it appears when in use;

Figure 2 is a sectional view through Figure 1 on the line 2—2;

Figure 3 is a sectional view through Figure 1 on the line 3—3;

Figure 4 is a diagram showing the switches and circuits associated with a generator and storage battery, as well as with the ignition system of an automobile.

Referring to the accompanying drawing by numerals, 4 indicates any desired structure of instrument board used on an automobile. This instrument board is arranged in front of the usual wall 5, which wall is of any desired structure, as for instance, the ordinary structure now in common use. A knob 9, as shown in Figure 1, carried by the instrument board 4 and is provided with a flaring base 10 fitted into the recess 11 of plate 12, which plate is riveted or otherwise rigidly secured to the instrument board 4. A groove 13 is formed in the knob 9, said groove accommodating the pin 14 fitted into the sleeve 15, which sleeve is provided with a small knob 16 adapted to rest against knob 9 when the engine of the automobile on which the device is used is standing still and the parts are locked. When the engine is running, the knob 16 is moved out to the dotted position shown in Figure 1. Sleeve 15 is urged toward the dotted position shown in Figure 1 by a spring 17, which spring also acts against the collar 18 screwed into the tubular extension 19 of knob 9. A rod 20 is screwed into the sleeve 15 and extends rather loosely through the sleeve 15 and also through the bushing 21 in the cap 22 of casing 8. The casing 8 is provided with a second cap 23 formed with a projection 24 having an apertured end 25 for accommodating the reduced portion 26 of rod 20. The casing 8 contains certain mechanism hereinafter fully described and in order that this mechanism may function properly, and rod 20 and associated parts extend at right angles to the instrument board 4, casing 8 is suspended in a particular manner. This suspension consists of an ear 27, riveted or otherwise secured to the casing 8. A link structure 28 is pivotally connected with two ears 27, said link structure being divided and having a turn buckle 29 so as to vary the length of the link as desired. The link 28 is also pivotally connected to an ear 30 carried by the plate 31 which is riveted or otherwise secured to wall 5. Plate 31 at the lower end is provided with an ear 32 accommodating the screw 33, which screw extends through the yoke 34. The yoke 34 is pivotally mounted on the two ears 35, said ears being preferably an integral part of the cap 22. By rotating the screw 33 and the turn buckle 29, the angle or casing 8 may be varied so that the axis of the casing 8 will be in a direction at right angles to the plane of the instrument board 4.

Arranged within cap 23 is a combination lock which holds rod 20 and associated parts in the full line position shown in Figure 3 when the engine is not in use. When it is desired to cause the engine to start, the combination lock is released and rod 20 is released. When this occurs spring 17 will move the parts including flange 64 to the dotted position shown in Figure 1.

When the flange 64 moves to the dotted position shown in Figure 1, the lug 66 is released and moved to the left in Figure 1. This lug is preferably integral with a bar 67, which bar is provided with an auxiliary contact plate 68 adapted to connect the auxiliary contacts 69 and 70 when the bar moves under the action of spring 71 to the position shown in Figure 4. This bar is guided by a rod 72 fastened to the plate 73. The plate 73, as shown in Figure 1, is provided with a slot 74 for receiving one end of the plate 49. The plate

73 may be welded or otherwise rigidly secured to the cap 23 and not only holds the pin 72 in place but also guiding pins 75 and 76 in place. A pin 77 is screwed into the block 67 and assists in guiding the block as it moves, said pin 77 passing through the switch casing 78. This switch casing may be made of any suitable insulation and the contacts 69 and 70 connected by any suitable wiring to the remaining part of the ignition system of the engine. Associated with the block 67 is a reciprocating member formed with blocks 79 and 80, said blocks being connected by a connecting section 81 whereby these blocks move simultaneously, guided by suitable pins 75, 76, 82 and 83. The block 79 carries a connecting metallic secondary plate 84 which is adapted to connect the secondary contacts 85 and 86, while the block 80 carries a metallic primary contact plate 87 adapted to connect the primary contact pins 88 and 89. The contact pins 88 and 89 are part of the starter circuit so that plate 87 must be in the position shown in Figure 2 in order that the starter 90 shall receive current. In addition, contact plate 68 must move over and connect the contacts 69 and 70 to complete the circuit of the starter 90. When this occurs, the ignition circuit is also closed so that as the starter turns over the engine, proper sparks may be produced to cause the engine to operate in the usual manner. As the engine begins to turn over, the generator 91 begins to generate current and the current will flow first through the magnets 92 for attracting the armature 93. The armature 93 has a stop or abutment 94 coacting with the abutment 95 rigidly secured to the bars 79 and 80. When armature 93 raises the stop 94, the springs 96 and 97 function for quickly moving the bars 79 and 80 from the position shown in Figure 2 to the position shown in Figure 4. This will move plate 87 out of engagement with contact 89 and thereby break the circuit of starter 90. This movement also will bring the plate 84 into engagement with contact 86 so that the circuit is complete between contacts 85 and 86. This will allow current to flow through these contacts and through certain other conductors hereinafter fully described, for supplying current to the ignition circuit and excess current to the storage battery 98. When these operations have taken place, the engine is running in the usual manner and the starter 90 is stationary as the circuit thereof has been opened at one point.

When it is desired to stop the engine, it is merely necessary to push the knob 16 inwardly so that the parts will assume the position shown in Figure 1 and then give knob 9 a turn. When this is done, not only will the locking mechanism be moved to a locked position, but the flange 64 will engage the stop or lug 66 and force the same and all the parts to the position shown in Figure 2. In Figure 2 it will be noted that there is left a small space 99 so that the block 67 may be moved a short distance before striking the connecting section or bar 81. This movement is sufficient to move the contact plate 68 out of engagement with pin 70. This movement breaks the ignition circuit and also opens the starter circuit at this same point. As the block 67 continues to move until it assumes the position shown in Figure 2, it will force the blocks 79 and 80 to the position shown in Figure 2, wherein the circuit through plate 84 will be broken while the circuit through plate 87 will be closed in respect to the contacts 88 and 89. As this is part of the starter circuit, the starter would operate were it not for the fact that a starter circuit is also through plate 68 which has been moved so as to open the circuit at that point. All these operations are done quickly and, consequently, the engine stops immediately.

To start the engine again, it is merely necessary to move rod 20 until the locking mechanism has been shifted to an unlocked position, whereupon spring 17 will again function to move flange 64 to the dotted position shown in Figure 1. The other parts will then automatically function as described. This operation of turning on and off the engine may be performed as often as desired. From this it will be noted that the actuation of the knob 9 and knob 16 will cause the engine to be either started or stopped and also will cause the parts to be locked or unlocked.

Referring to the diagram in Figure 4, it will be noted that the member 100 acts to permit the current to pass in the direction of the arrow from the generator to the storage battery but will not permit the current to pass in the opposite direction. This is a device well known on the market for accomplishing this result. When the flange 64 has been moved to the position shown in dotted lines in Figure 1, contacts 69 and 70 will be engaging the plate 68 so that current will pass from battery 98 through a heavy wire 101, through contact 70, through plate 68 to contact 69 and from thence through a heavy wire 102 to the ignition circuit 103. Current will also pass through the heavy wire 102 to the contact 88, plate 87 and contact 89 to a heavy wire 104. This wire is connected with one of the terminals of the starter 90 while the other terminal is grounded. In this way, current will be supplied from the battery to the starter for turning over the engine. At the same time, current will be supplied to the ignition circuit of the battery whereby as the engine turns over, it will begin to fire in the usual manner. As soon as the engine begins to operate, the generator 91, which is connected with the engine in the usual manner, begins to function and supply current to the wire 105. This wire is connected to the windings of magnets 92 and these magnets are grounded on one side so that as soon as the generator begins to function, current will be supplied to the magnets 92 for causing armature 93 to function. As soon as armature 93 functions, the blocks 79 and 80 will be allowed to move over to the position shown in Figure 16 whereupon contacts 85 and 86 are connected by the plate 84. Current will, therefore, pass from wire 101 through wire 106 to contact 85, through plate 84 to contact 86 and from thence through wire 107 to member 100, and from member 100 through wire 108 to wire 101 where it passes onto the ignition circuit 103, though an excess current will pass in a reverse direction through the storage battery 98 for re-charging the same. As soon as the parts have been moved for causing plate 84 to connect the contacts 85 and 86, the starter circuit 90 will be opened by plate 87 moving away from contact 89.

I claim:

1. A switch device including a pair of auxiliary contacts, a pair of primary contacts, a pair of secondary contacts, a reciprocating member, spring means for moving said reciprocating member in one direction, a primary contact plate carried by said reciprocating member, a secondary contact plate carried by said member and offset from the primary contact plate, said spring means acting to hold the reciprocating member normally in position whereby a circuit through said primary contacts is open and a circuit through

said secondary contacts is closed, manually actuated means for moving said reciprocating member and the contacts carried thereby for opening the circuit through the secondary contacts and closing said starter circuit through the primary contacts, a stop for preventing said reciprocating member from moving under the action of said spring means, electro-magnetic means for moving said stop to an inoperative position whereby said spring means may move said reciprocating member, a sliding member carrying a sliding contact plate adapted to close a circuit through the auxiliary contacts, said manually actuated means when functioning acting to hold said sliding contact in a non-functioning position and spring means for moving said sliding contact into functioning position.

2. A switch of the character described provided with a pair of primary contacts forming part of a circuit, a movable primary plate for connecting said primary contacts when the plate is in one position, a pair of auxiliary contacts forming part of a second circuit, said auxiliary contacts also forming part of the first circuit, an auxiliary slide plate adapted when in one position to contact said auxiliary contacts, a manually actuated member for simultaneously moving the auxiliary plate out of contact with said pair of auxiliary contacts and said primary plate into contact with said pair of primary contacts, a spring for moving said auxiliary plate for closing said auxiliary contacts, spring means for moving the primary plate to a position for opening the first circuit at said pair of primary contacts, a stop for preventing said last mentioned spring means from functioning, and an electromagnetic means for moving said stop to an inoperative position so that said spring means may function.

3. A switch of the character described comprising a substantially U-shaped reciprocating block, a primary plate carried by said block on one side, a secondary plate carried by said block on the opposite side and opposite from the primary plate, a pair of primary contacts forming part of a circuit and positioned to be connected by said primary contact plate when said plate is in one position, a pair of secondary contacts coacting with said secondary contact plate, a reciprocating member and auxiliary contact plate carried by said reciprocating member, a pair of auxiliary contacts adapted to be connected by said auxiliary contact plate, said auxiliary contacts forming part of the circuit of said primary contacts, manually actuated means positioned to move said reciprocating member for shifting the same and the position of said reciprocating block, independent spring structures for moving both the reciprocating member and the reciprocating block in a reverse direction, an abutment for holding the reciprocating block against movement by the action of certain of said springs, and a magnetic means for moving said abutment out of operative position.

4. In a device of the character described, a switch mechanism including a pair of primary contacts forming part of an electric circuit, a movable primary plate for connecting said primary contacts when the plate is in a given position, a pair of secondary contacts forming part of a second circuit, a movable secondary plate for connecting said secondary contacts when the plate is moved to a predetermined position, a carrier for supporting said plates and holding the plates in permanent relation to each other, spring means for moving said carrier to a position whereby the primary contacts will be out of engagement with the primary plate and the secondary contacts will be in engagement with the secondary plate, a stop for holding said carrier against movement, electrically actuated means for moving said stop so as to release said carrier so that said spring means may function, said electrically actuated means being electrically connected with the circuit of said secondary contacts so as to function as soon as current is supplied to said secondary contacts, a pair of auxiliary contacts forming part of the circuit of the said primary contacts, a movable auxiliary plate adapted to close the circuit of said auxiliary contacts when in a given position, a second carrier for supporting said auxiliary plate, a spring for moving said second carrier to a position for causing the auxiliary plate to engage the auxiliary contacts, and manually actuated means for moving both of said carriers so that the secondary plate and the auxiliary plate will be out of engagement with their coacting contacts, and the primary plate will be in contact with the primary contacts.

5. A switch mechanism including a carrier member having a primary plate and a secondary plate, spring means for moving said carrier to a given position, a stop for preventing said carrier from moving under the action of said spring means, electrically actuated means for moving said stop to an inoperative position, a pair of secondary contacts coacting with said secondary plate, one of the secondary contacts being in electrical communication with the electrically operated means for releasing said carrier, a pair of primary contacts coacting with said primary plate and forming part of the circuit, an auxiliary plate, a pair of auxiliary contacts coacting with said auxiliary plate and forming part of the circuit of said primary contacts, a spring for moving said auxiliary plate to an operative position, and manually actuated means for moving said auxiliary plate and said carrier to positions whereby said primary and auxiliary plates will not function.

JOHN P. GERAGHTY.