

March 4, 1930.

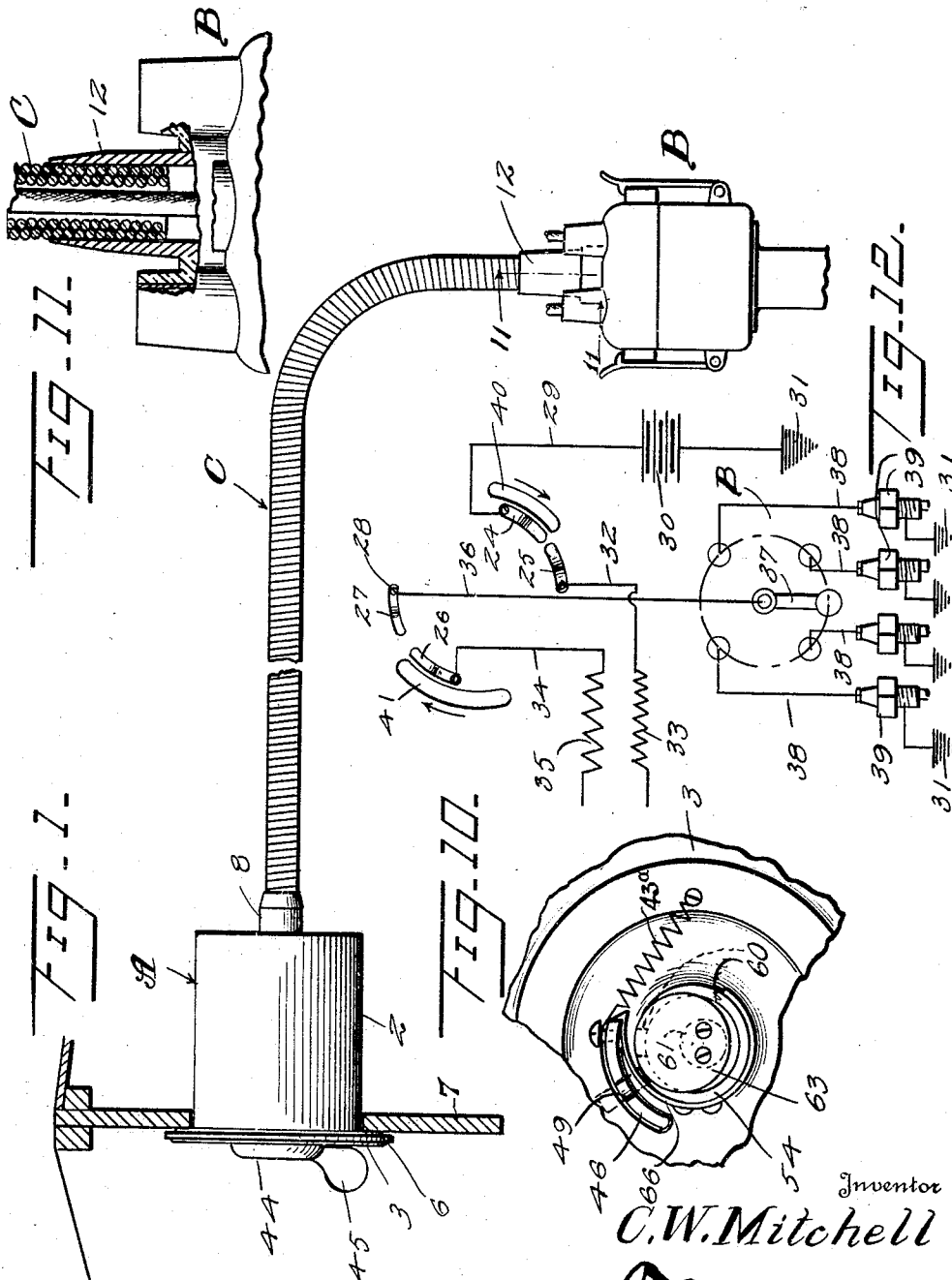
C. W. MITCHELL

1,749,672

LOCK CONTROLLED IGNITION SWITCH

Filed Sept. 5, 1925

3 Sheets-Sheet 1



Inventor

C.W. Mitchell

By

A. H. Humphreys
Attorney

March 4, 1930.

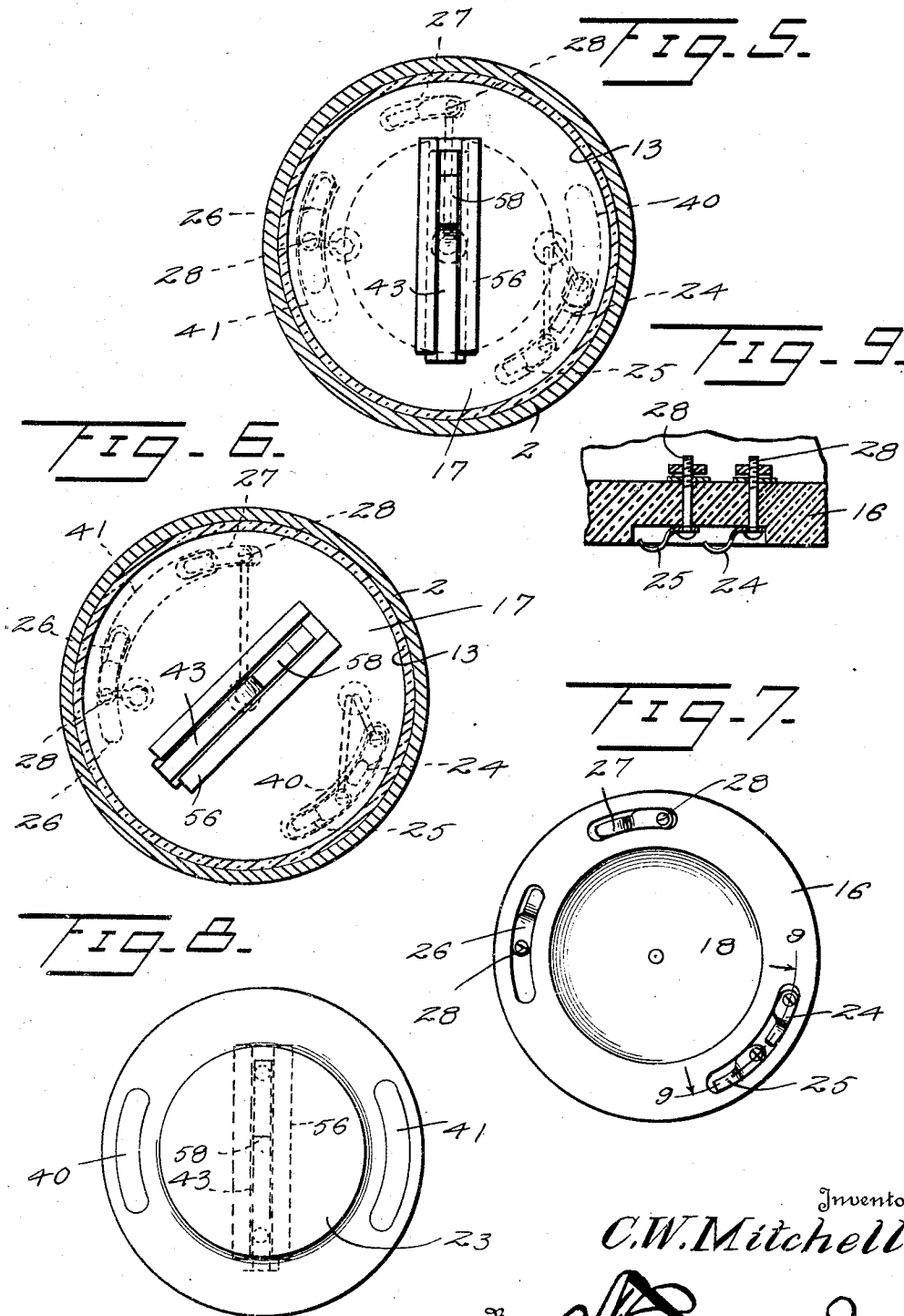
C. W. MITCHELL

1,749,672

LOCK CONTROLLED IGNITION SWITCH

Filed Sept. 5, 1925

3 Sheets-Sheet 3



Inventor
C.W. Mitchell

By

A. J. Randolph
Attorney

UNITED STATES PATENT OFFICE

CHARLES W. MITCHELL, OF NASHVILLE, TENNESSEE

LOCK-CONTROLLED IGNITION SWITCH

Application filed September 5, 1925. Serial No. 54,737.

This invention relates to lock controlled ignition switches for automobiles, and has for one of its objects the provision of a device of this character that can be operated to break the ignition circuit only after the key has been removed from the lock, whereby to afford the maximum protection against theft by rendering it impossible to leave the automobile unattended with the key in the lock.

A further object of the invention is the provision of a switch of the character stated which will automatically operate to break the ignition circuit on the withdrawal of the key from the lock.

The foregoing and other objects are attained by the construction, combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, wherein:

Figure 1 is an elevational view illustrating the application of the ignition switch,

Figure 2 is a sectional view taken on a plane extending vertically and centrally through the ignition switch,

Figure 3 is a sectional view taken on the plane indicated by the line 3—3 of Figure 2,

Figure 4 is a view in front elevation of the ignition switch,

Figure 5 is a sectional view taken on the plane indicated by the line 5—5 of Figure 2,

Figure 6 is a view similar to Figure 5 with the exception that the movable contact carrying member is shown in circuit closing position,

Figure 7 is a view in front elevation of the fixed contact carrying member,

Figure 8 is a view in rear elevation of the movable contact carrying member,

Figure 9 is a detail sectional view taken on the plane indicated by the line 9—9 of Figure 7,

Figure 10 is a view illustrating the relative positions of the parts shown in Figure 3 after the switch has been operated to close the ignition circuit,

Figure 11 is a detail sectional view taken on the plane indicated by the line 11—11 of Figure 1, and

Figure 12 is a diagrammatic view illustrating

the application of the switch to an ignition system.

Corresponding and like parts are referred to in the following description, and designated in the several views of the accompanying drawings, by similar reference characters.

In the drawings A designates my improved switch, B the distributor of the ignition system of an automobile, and C a flexible metal sheath or tube extending from the switch A to the distributor B.

The switch A comprises a casing 1 which while preferably cylindrical may be of any other desired or appropriate formation and the side wall 2, front wall 3 and rear wall 4 of which are secured together by screws 5. The front wall 3 is provided with a flange 6 to permit the switch to be secured to the instrument board 7 of an automobile in the manner illustrated in Figure 1. The wall 4 is provided with a thimble 8 within and to which one end of the sheath or tube C is secured. The thimble 8 passes through an opening 9 in the wall 4, and is provided at its inner end with an outer flange 10. Screws 11 engaging the flange 10 and wall 4 secure the thimble 8 in place. The other end of the sheath or tube C is positioned in and secured to the central boss 12 of the distributor B.

A bushing 13 of insulating material is located in the casing 1, and is held against rotation with respect thereto by a pin 14. The rear portion of the bushing 13 is counterbored as at 15 for the reception of a fixed contact carrying member 16 and a rotatable contact carrying member 17. The members 16 and 17 are made of insulating material, and the member 16 is provided in its front side with a cylindrical recess 18 and in its rear side with a recess 19. A plate 20 of insulating material is positioned in the rear end of the bushing 13 between the member 16 and casing wall 4, and is provided with an opening 21 which registers with the thimble 8. The member 17 is located between the front side of the member 16 and the annular shoulder 22 provided by the counterbore 15, and is provided with a cylindrical boss 23 fitting in the recess 18 of the member 16. The member 17 is rotatably supported by the bushing 13

and member 16, and is held in full abutting contact with the member 16 by the shoulder 22. The member 16 is provided at its front side with a pair of relatively spaced spring contacts 24 and 25 and a pair of relatively spaced spring contacts 26 and 27. The respective pairs of contacts are located diametrically opposite each other, and are secured to the member 16 by binding screws 28 which extend into the recess 19 of this member in order to permit the leads of the ignition system to be readily connected thereto. As shown in Figure 12 a lead 29 extends from one side of the battery 30 to the contact 24, the other side of the battery being grounded as shown at 31, a lead 32 extends from the contact 25 to the primary induction coil 33, a lead 34 extends from the secondary induction coil 35 to the contact 26, and a lead 36 extends from the contact 27 to the rotor 37 of the distributor. The lead 36 passes through the sheath or tube C. Due to the construction of the sheath or tube C, and due to the manner in which it is secured to the casing 1 and distributor B, access cannot be gained to the lead 36, and in view thereof it is impossible to start the automobile without first closing the switch. Leads 38 extend from the distributor B to the spark plugs 39.

The member 17 is provided with oppositely arranged bridging contacts 40 and 41 which when this member is in on position engages the contacts 24—27 and which when this member is in "off" are out of engagement with said contacts 24—27. When the switch is closed there is established a circuit which includes the battery 30, lead 29, contacts 24, 25 and 40, lead 32 and primary induction coil 33, and a circuit which includes the secondary induction coil 35, lead 34, contacts 26, 27 and 41, lead 36 and distributor B.

A lever or handle 42 rotatably supported by the casing wall 3, and a bolt 43 slidably carried by the member 17, constitutes means by which said member may be manually moved into on position. The lever 42, bolt 43, and a spring 43^a secured to the lever and casing wall 3, constitute means by which the member 17 is automatically moved into off position as soon as released. The lever 42 comprises a body portion 44 in the form of a ring, a finger piece 45 extending radially from the ring 44, and an arm 46 extending axially from the ring 44. The ring 44 is positioned against the outer side of the wall 3 and is rotatably mounted on a boss 47 carried by said wall. The arm 46 extends into the casing 1 through a slot 48 in the wall 3 and is provided at its inner end with a notch 49. The arm 46 and the end walls of the slot 48 serve to limit the movement of the lever 42 during its manual and automatic operations to effect the closing and opening of the switch. The ring 44 covers the opening 48 and is pro-

vided in its inner side with a recess 50 for the reception of the boss 47. The ring 44 is provided in its outer side with a recess 51 for the reception of the flange 52 of a lock barrel 53. This part has threaded engagement with a sleeve 54 extending inwardly from the wall 3, and is secured against withdrawal by a pin 55 which passes radially through the lock barrel 53 and sleeve 54. The bolt 43 is slidably carried by a guide 56 secured to the front side of the member 17 by elements 57, and is provided with a forwardly extending lug 58 which when the bolt 43 is in its normally retracted position fits in a notch 60 in the sleeve 54, and which when the bolt is projected, fits in the notch 49 of the arm 46. The bolt 43 is held in retracted position by a spring 59. It will thus be seen that when the bolt 43 is projected the lever 42 is connected to the member 16 and when the bolt 43 is retracted the lever is free of connection with the member 16 and said member is locked against casual movement.

The barrel 53 carries a rotatably mounted plug 61 having a key receiving passage 62. At its inner end the plug 61 is provided with a cam 63 which contacts with the bolt lug 58. The plug 61 is normally held against movement by spring pressed tumblers 64 and the pin 55. Pins 65 carried by the plug 61, will, when actuated by the insertion of the key into the plug, move the tumblers 64 and pin 55 into plug releasing position. A spring detent 66 is secured to the outer side of the sleeve 54 and overlies and contacts with the pin 55. The detent 66 is adapted to engage the arm 46 for the purpose of holding the switch closed. The detent 66 normally occupies a position out of the path of the arm 46, but is moved into position for engagement with the arm 46 by and on the insertion of the key into the plug 61. The spring 43^a is secured to the casing wall 3 and arm 46, and is adapted to open the switch when the lever 42 is released. When the switch is opened, the bolt 43 engages the sleeve 54 and due thereto holds the switch member 17 in "off" position, the plug 61 and cam 63 are locked against movement by the pin 55 and tumblers 64, the lever 42 is free of connection with the member 17, and the detent 66 is in inactive or retracted position, all as clearly shown in Figures 2 and 3. The insertion of the key in the lock releases the plug 61 and cam 63 and forces the detent 66 into active or projected position. The turning of the key and the consequent rotation of the cam 63, results in the bolt 43 being moved against the tension of the spring 59 in a direction to carry its lug 58 out of engagement with the sleeve 54 and into engagement with the arm 46. As the lever 42 is now connected to the member 17, the switch may be closed by rocking the lever to the left. This moves the member 17 to "on" position, and as soon as

said member reaches this position the detent 66 engages the arm 46 and locks the switch closed. As the key prevents the retraction of the detent 66, the switch cannot be opened until after the key has been withdrawn from the lock. When the key is turned to its first position, into which position it must be moved before it can be withdrawn, the cam 63 will be retracted, and the withdrawal of the key from the lock will result in the retraction of the detent 66. Promptly on the release of the lever 42 by the retraction of the detent 66, the spring 43^a, which was tensioned during the closing of the switch, returns the lever 42 and the member 17 to their normal positions. As soon as the parts reach these positions, the bolt 43 will be in registration with the notch 60 in the sleeve 54, so as to permit the spring 59 to retract the bolt resulting in its being moved out of engagement with the lever 42 and into engagement with the sleeve 54.

As the high tension lead 36 is located in the armored tube C, it is impossible to start the engine by the use of a transformer in addition to the one forming a part of the ignition system of the engine. It will, therefore, be apparent that the engine cannot be started without first closing the switch.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the device which I now consider to be the best embodiment thereof, I desire to have it understood that the device shown is merely illustrative, and that such changes may be made when desired as are within the scope of the invention as claimed.

What is claimed is:—

1. An electric switch comprising a movable circuit making and breaking member, a fixed member, a spring pressed movably mounted operating member for said first member, a spring pressed bolt carried by said first member and normally engaging said fixed member, a detent for engagement with said operating member, and a lock for moving the bolt into engagement with the operating member and holding the detent in position to engage said operating member.

2. An electric switch comprising a movable circuit making and breaking member, an operating member for said first member, and lock controlled means for connecting and disconnecting said member and holding said members against movement to open the switch while the key is in the lock.

3. A lock controlled electric switch embodying a rotatable circuit making and breaking member, a handle for operating

said member, a key controlled member adapted to engage and hold said handle against movement when the key is in the lock and said first member is in circuit making position, means for moving said first member into circuit breaking position on the withdrawal of the key from the lock, and means for disconnecting said first member and handle when the latter reaches its circuit breaking position.

4. An electric switch comprising a rotatable circuit making and breaking member, a fixed member provided with a notch, a bolt movably carried by said first member, a spring normally retaining the bolt in the notch of the fixed member, an operating member for said first member and provided with an arm having a notch, and means by which the bolt may be moved out of the notch of the fixed member and into the notch of the operating member to permit the operation of said first member.

In testimony whereof I affix my signature.
CHARLES W. MITCHELL.

90

95

100

105

110

115

120

125

130