March 22, 1927. 1,621,729

W. KAISLING

COMBINATION SWITCH

Filed Dec. 15, 1922 2 Sheets-Sheet 1

Fig. 3.

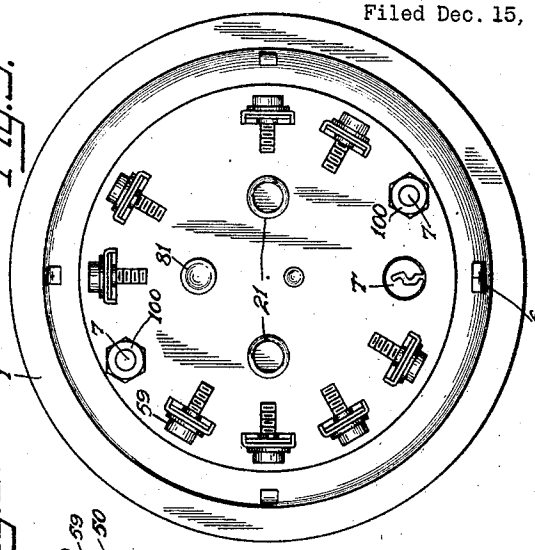


Fig. 6.

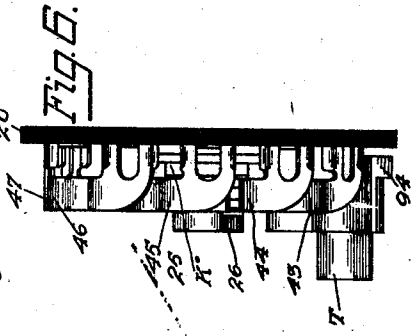


Fig. 2.

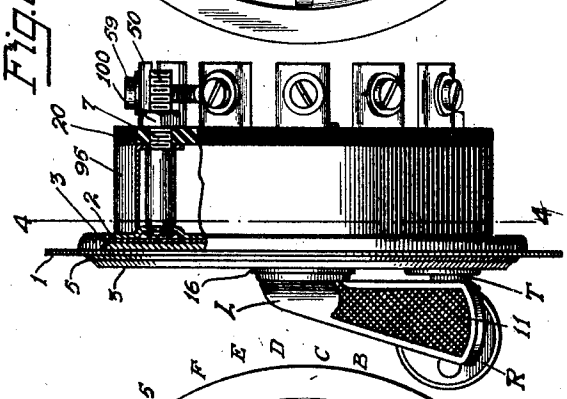


Fig. 4.

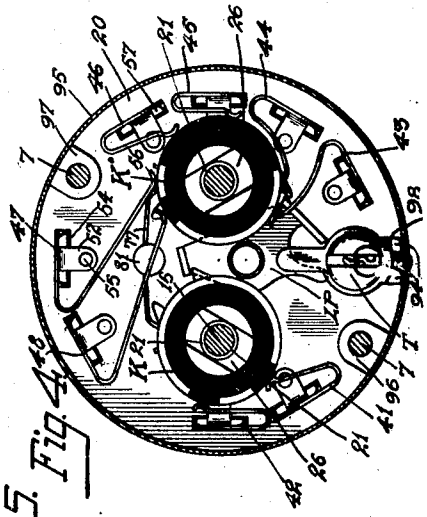


Fig. 1.

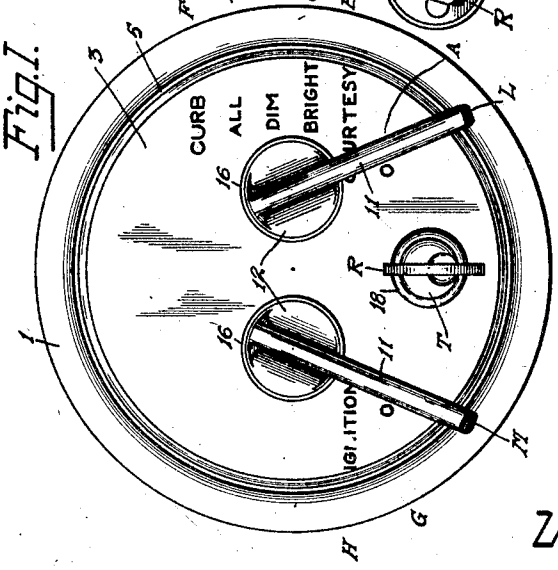
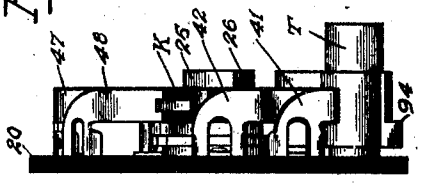


Fig. 5.



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March 22, 1927. 1,621,729

W. KAISLING

COMBINATION SWITCH

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Fig. 9.

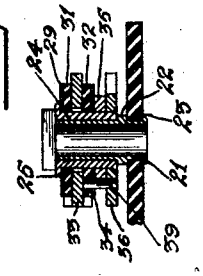


Fig. 10.

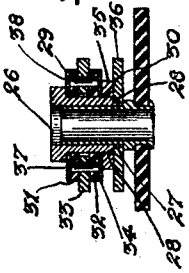


Fig. 11.

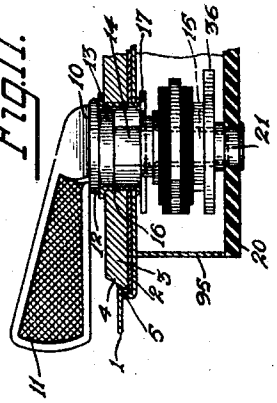


Fig. 16.

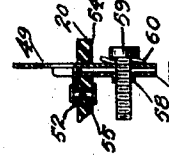


Fig. 12.

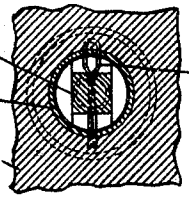


Fig. 14.

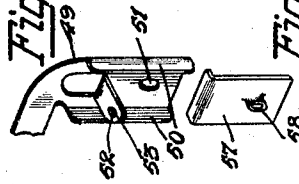


Fig. 15.

Fig. 13.

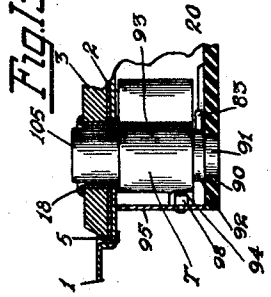


Fig. 7.

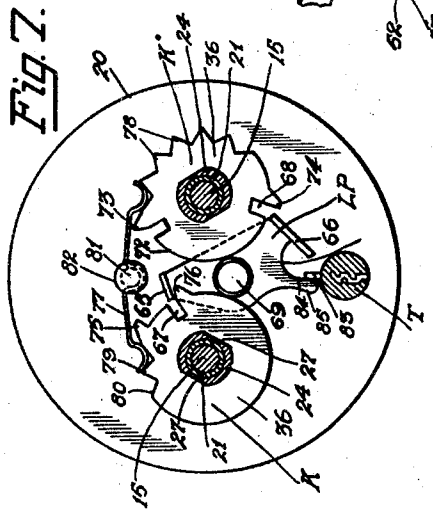
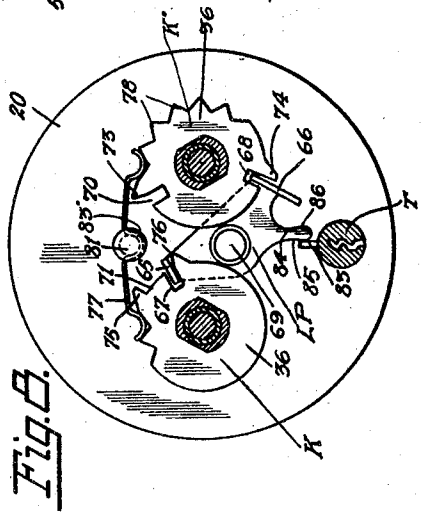


Fig. 8.



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Patented Mar. 22, 1927. 1,621,729

UNITED STATES PATENT OFFICE.

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COMBINATION SWITCH.

Application filed December 15, 1922. Serial No. 607,045.

My invention relates to electrical switches in general, and has to do more particularly with switches for controlling a plurality of circuits. The present embodiment of my invention is constructed more particularly for use in connection with ignition or lighting circuits for automobiles or the like. An object of my invention is the provision of a switch of the class described, in which a feature of my invention is the provision of a lock member which is pivotally secured to the switch, and which lock member is adapted to lock other movable members of the switch in certain positions against movement.

Another feature of my invention is the manner in which the contact springs of my switch are secured in place.

A further feature of my invention is the provision of means for holding the lock barrel and casing of a tumbler lock in an operative position in my switch.

Still another feature of my invention is the manner in which the designating plate of my switch is held in place.

Another feature of my invention is the provision of rotor contact members and means for rotatably supporting the same in my switch, and also the provision of actuating members for engaging said rotor members and said supporting means for effecting rotary movement of said rotor members.

Still another feature of my invention is the provision of spring means for engaging the rotor contact members of my switch for effecting a snap action of said rotor contact members when the same are rotated from one position to another position, said spring means also serving to retain the rotor contact members in their different set positions.

The above features, as well as other desirable features and advantages not enumerated above, will be pointed out in the ensuing specification and appended claims.

For a better understanding of my invention, reference may be had to the accompanying drawings, in which like reference characters in the different views denote like parts, and in which—

Fig. 1 is a front view of the switch of my invention;

Fig. 2 is a right side view of Fig. 1, having a portion of the switch cut away to show the manner in which the front and back parts of the switch are secured together;

Fig. 3 is a back view of the switch of my invention;

Fig. 4 is a view along the line 4—4 of Fig. 2;

Fig. 5 is a left side view of Fig. 4, showing the mounting plate and its assembled parts;

Fig. 6 is a right side view of Fig. 4, showing the mounting plate and its assembled parts;

Fig. 7 is a view showing the rotor elements and the locking member for locking said rotor elements in position against rotation, and also showing the spring means for engaging said rotor elements to effect a snap action when the elements are rotated, the locking member in this view being shown in its unlocked position;

Fig. 8 is a view identical with Fig. 7, but showing the locking member of my invention in its locked position to prevent rotation of the rotor elements;

Fig. 9 is a sectional view showing the construction of the rotor element of my invention supported upon a stud secured in a mounting plate;

Fig. 10 is another sectional view similar to Fig. 9, showing a further construction of the rotor element supported upon a stud secured to a mounting plate;

Fig. 11 is a view showing the front part and back part of my switch in section, and also showing the rotor element and an actuating member for actuating said rotor element secured in said switch;

Fig. 12 is a view showing one of the actuating members of my invention secured to the front part of my switch;

Fig. 13 is a view showing the tumbler lock, for controlling the locking member of my invention, secured in and between the front and back parts of my switch; and also showing the means for preventing the rotation of the casing of the tumbler lock;

Fig. 14 is a view showing the construction of one of the spring contact members of my invention;

Fig. 15 is a view of a clamping member which is adapted to be secured to the member shown in Fig. 14; and

Fig. 16 is a view showing the manner in which the members shown in Figs. 14 and 15 are secured in the back mounting plate of my switch.

Referring now in general to my inven-

tion, it comprises a lighting switch unit L and an ignition switch unit M. The light switch unit L has a normal or off-position A and five operative positions B, C, D, E and F, which switch unit L, when in these different positions will close circuits to effect the burning of certain lamps of the automobile.

The ignition switch M has a normal or "off" position G, in which position the ignition apparatus is rendered inoperative, and an operative position H, as will be more fully hereinafter described. I also provide locking mechanism which consists preferably of a pin-tumbler cylinder type lock T, which controls a pivotally supported locking plate LP, which is adapted to lock the lighting and ignition switch units L and M against rotation. The locking mechanism is so arranged that it operates only when the ignition switch unit M is in its normal or "off" position G, and the lighting switch unit L is in its "curb" position F, or in its "off" or normal position A. When the ignition switch unit M is in its position H, the rotatable lock barrel of the lock T can only be turned part way by the key. Now, if the operator attempts to operate the lock T, he is at once aware that the ignition switch unit M is in its operative position or ignition position H, or if the lighting switch unit L is in any of its positions except its "off" or "curb" positions, the key cannot be removed from the tumbler lock T, as will be more clearly pointed out in the ensuing specification.

Referring now more in detail to my invention, I will first describe the manner in which the designating plate 2 and the switch units L and M are secured to the front part of my switch.

A cup-shaped mounting plate 1 is provided, in the cup-shaped portion of which is adapted to fit an escutcheon or designating plate 2 of suitable material, bearing the names of the different positions to which the switch units L and M may be operated. A transparent member 3 such as glass or the like is provided, and is of a size to fit into the cup-shaped portion of the mounting plate 1 and to engage the escutcheon or designating plate 2, said member 3 being transparent for the purpose of permitting the reading of the names borne by the escutcheon plate 2. The transparent member 3 has its peripheral edge 4 sloping towards the outer part of the cup-shaped member 1 and a ring 5 is provided which is suitably shaped to encircle and engage the sloping peripheral edge 4 of the transparent member 3, said ring member 5 being adapted to fit in the cup-shaped portion of the mounting plate 1 and being secured therein by means of lugs or extensions 6 formed integrally with the ring member 5, and which lugs or extensions 6 extend through suitable openings in the mounting plate 1 and then have their ends turned back to prevent the ring member 5 from becoming displaced from the mounting plate 1. Thus, it is apparent that the ring member 5 which engages the transparent member 3 will be securely held in the cup-shaped portion of the mounting plate 1. A pair of screw-threaded supporting studs 7 are provided and suitably secured in depressions in the bottom of the cup-shaped portion of mounting plate 1 so as not to interfere with the escutcheon plate 2 and transparent member 3.

The switch levers of the units L and M are constructed and secured in the mounting plate 1 in the same manner so that a description of one will be sufficient. The lever of the switch unit M comprises an L-shaped member 10 whose leg 11 serves as an operating handle for moving the same, the other leg of the L-shaped member 10 is provided with a flange 12, a circular portion 13, a rectangular portion 14 and a cylindrical end portion 15, as shown in dotted lines in Fig. 11. A ferrule 16 is provided which passes through suitable aligned openings in the transparent member 3, escutcheon or designating plate 2 and the mounting plate 1, and its end which protrudes slightly beyond the face of the plate 1 is spun over to secure the transparent member 3 and plate 2 to the mounting plate 1 against displacement. The opening in ferrule 16 is of a size to receive the cylindrical portion 13 of the lever 10 and when the lever 10 is in position in the opening of the ferrule, its flanged portion 12 rests against the ferrule 16. To secure the lever 10 in position in the opening of the ferrule 16 against longitudinal movement but to permit the same to be rotated, I provide a cotter pin 17 which passes through a suitable orifice in the rectangular portion 14 of the lever 10, and whose ends span the spun-over portion of the ferrule 16.

Another ferrule 18 similar to that of cylindrical member 16 is provided and is secured in suitable aligned openings, in the plate 1, escutcheon plate 2 and transparent plate 3 in the same manner as cylindrical member 16 is secured, as described above. The said cylindrical member 18 is provided and adapted to receive one end of the tumbler lock T, as will be pointed out more in detail in the ensuing specification.

The ferrules 16 and 16′ associated with the switching units L and M and the ferrule 18, through which the barrel of the lock extends, form securing means for the transparent member 3 and plate 2 to the plate 1.

Referring now to the back structure of my invention as illustrated, it comprises preferably a mounting base or plate 20 made of any suitable insulation material,

such as bakelite or the like. To the base or plate 20 is secured a pair of cylindrical members or supporting studs 21 whose purpose will be pointed out in the ensuing specification. Each supporting stud 21 is provided with a collar or shoulder 22 integrally formed with the said stud 21 near its one end, the said one end protruding through a suitable opening 23 in the base or plate 20 until one face of the collar 22 engages the side of the base or plate 20, said protruding end being then staked over to prevent the removal of the supporting stud 21 from its mounted position in the base 20. A pair of rotor circuit closing elements K and K′ are provided and are adapted to be rotatably supported on the pair of supporting studs 21 and as each rotor element K and K′ is constructed in the same manner and also rotatably supported on the supporting stud 21 in the same manner, a description of one will suffice. The rotor element comprises a cylindrical member 24 which is provided with a central opening of a size to permit it to be slipped over the stud 21 so that one end of said member 24 will abut against the face of the collar 22, the other end 25 of said member 24 being enlarged and extending above the end of the stud 21, and which enlarged end 25 is provided with a transverse slot or groove 26 formed therein, and the purpose of said slot will be pointed out later. The other end of the cylindrical member 24 has its sides opposite each other shaved so as to form flat faces 27 and also to form shoulders 28. An insulation washer 29 having an orifice of a size to permit it to be slipped over the body portion 30 of the cylindrical member 24 is provided and which washer 29 engages the lower face of the enlarged end portion 25 of said member 24. A pair of cams 31 and 32 which are of suitable insulation material is provided and which cams are provided with orifices of a size to permit their being slipped over the body portion 30 of member 24. A metallic cam 33 of suitable conducting material is also provided, which has an orifice of a size to permit its being slipped over the portion 30 of member 24, and when in place rests between the two insulation cams 31 and 32. A washer 34 of suitable insulation material and adapted to fit over the portion 30 of member 24 and to engage the insulation cam 32 is provided. A metallic spacing washer 35 is provided whose diameter is somewhat smaller than the diameter of the cams 31 and 32 and cam 33 and of a thickness so that one face of the washer 35 becomes almost flush with the shoulders 28 provided in the end of the member 24 when the said washer 35 is slipped over the end of the member 24 and into engagement with the washer 35. A holding member 36 having its peripheral edge provided with a number of depressions or teeth is provided, and which member 36 has a central opening of a size and shape to permit it to be slipped on to the end of the member 24 so that its one face will engage the shoulders 28 and the bottom face of the spacing washer 35. The flat faces 27 provided in the end of the member 24 by engaging similar faces in the central opening of the member 36 prevent the said member from rotating on the said member 24. To secure the installation cams 31 and 32 and metallic cam 33 in position in relation to each other, a pair of pins 37 and 38 are provided which engage suitable orifices in said cams 31 and 32 and cam 33, said pins 37 and 38 being retained in the said orifices by means of a drive fit. A pin 39 suitably secured in the member 36 extends upwardly through an opening in the periphery of the washer 35 and into engagement with suitable openings in the member 34 and cam 32. This pin 39 by engaging openings in the washer 35, member 34 and cam 32 will prevent the cams 31, 32 and 33, member 34 and washer 35 from rotating on the member 24, due to the fact that the said pin 39 is secured in the holding member 36, which member 36 is secured on the end of the cylindrical member 24 against rotation. To prevent the holding member 36 and other members secured to the cylindrical member 24 from being displaced from said member 24, the end of said member 24 extends slightly beyond the lower face of the holding member 36 and is then staked over.

Associated with the rotor element K are contact springs 41 and 42 of suitable conducting material secured in the base 20, and associated with the rotor element K′ are contact springs 43, 44, 45, 46, 47 and 48, which are also secured in the base 20. Springs 41, 42, 43, 44, etc., are similarly constructed and secured to the base 20 in the same manner, so that by describing one of them the construction and manner of securing the same to the base 1, the construction and the securement of the others will be readily apparent.

The contact spring is stamped out of some suitable spring and conducting material and has an angular extending end portion 49, which angular end portion 49 has its sides 50 turned over at right angles to the body portion intermediate said sides 50, said intermediate body portion having an orifice 51 provided therein, and also a member 52 cut out of said body portion and turned over to assume a right angular position relative to said intermediate body portion, said member 52 being provided with an orifice 53, the purpose of which will be pointed out later. The free end of the contact spring is provided with a rounded or curved end portion 56 which forms a contacting end for engaging the non-conducting cams 31 and 32 and

the metallic cam 33 of the rotor element, as will be pointed out more in detail in the ensuing specification. The base 20 is provided with a slot 54 through which the end portion 49 of the contact spring extends until the angular member 52 is brought into engagement with the face of the base 20. The contact spring is held in this position by means of a suitable rivet 55 which extends through the orifice 53 in the end of the member 52 and through a suitable opening in the base 20. The contact spring when in this position has its free end provided with the curved end 56 in operative engagement with the cams 31 and 32 or the cam 33 of the rotor element and is maintained in engagement therewith by the spring tension of said contact spring.

A clamping plate or member 57 of suitable conducting material having its one end turned back is adapted to extend into the slot 54 and to engage the inner faces of the turned over sides 50 of the end portion 49 of the contact spring, the said turned over end of the plate 57 engaging the face of the end portion 49 intermediate the sides 50. The plate 57 has a portion of its body near one of its ends punched outwardly to provide a screw-threaded orifice 58. The clamping plate or member 57 is secured in this position as just described, by means of a screw 59, which extends through the orifice 51 in the end portion 49 of the contact spring and which has screw-threaded engagement with the screw-threaded orifice 58 in the plate 57. A split spring washer 60 is provided and is of a size to fit over the screw-threaded end of the screw 59 and adapted to rest between the head of the screw 59 and the portion 49 of the contact spring, the said spring washer 60 serves to prevent the screw 59 from disengaging the end portion 49 and the member 57, due to the jarring or vibration of the automobile. The clamping plate or member 57 is provided and adapted to clamp a terminal of a current carrying conductor to the end portion 49 of the contact spring through the medium of the screw 59, whereby contactual engagement is obtained between the terminal of the current carrying conductor and the contact spring.

A description of the means for locking the rotor elements K and K′ in position against rotation and also the means for effecting a snap action of the rotor elements when the same are rotated from one position to another, will now be given.

An angularly shaped locking plate LP having angularly extended portions or ears 65 and 66 integrally formed therewith and of a size and shape to permit the same to engage the slots 67 and 68 provided in the members 36 of the rotor elements K and K′ as shown in Fig. 8 when the said rotor elements are in this position, is provided and is pivotally secured on the base 20 and in operative relation with the members 36 by means of a suitable rivet or pivot pin 69 which extends through a suitable opening in the locking plate LP and through an opening in the mounting plate 20, and then has its end staked over to hold the same in place. When the rotor element K′ is rotated so as to bring the slot 70 in position to receive the ear 66 of locking plate LP and the rotor element K remains in the same position as shown in Figs. 7 and 8, the ears 65 and 66 of the locking plate LP will engage the slots 67 and 70 to lock the rotor elements K and K′ in position against rotation; but when the rotor element K is moved out of its normal position the locking plate LP cannot be moved to lock the said rotor elements, for in this instance the ear 65 will engage the edge 71 of member 36 to prevent the movement of said locking plate LP to its locking position. The same is true when the rotor element K′ is moved to take the slot 68 or slot 70 of the member 36 out of the path of travel of the ear 66 of the locking plate LP, for when this condition is present the ear 66 will engage the edge 72 of the member 36 of K′ to prevent the locking plate LP from moving to its locking position. To limit the amount of rotation of the rotor element K′, a pair of teeth 73 and 74 integrally formed with the member K′ are provided and are adapted to engage the ear 66 of plate LP so that when the rotor element K′ is rotated the tooth 73 or tooth 74, depending on which direction K′ is rotated, will engage the ear 66 to prevent the further rotation of K′ in that direction. A pair of teeth 75 and 76 are provided for the rotor element K and are adapted to engage the ear 65 to prevent the rotation of K in the same manner as that described above in respect to rotor element K′.

For effecting a snap action of the rotor elements K and K′ a flat leaf spring 77 is provided which has its ends curved and adapted to have one of its ends engage and rest between a pair of the teeth 78 or the tooth 73 and its adjacent tooth 78, depending on the position of the rotor element K′. The other end of the leaf spring 77 is adapted to engage and rest between the tooth 75 and the tooth 79 of rotor element K or to engage and rest between the tooth 79 and face 80 opposite said tooth 79. The leaf spring 77 is held in operative position relative to the rotor elements K and K′ by means of a pin 81 which is secured to the mounting plate in any suitable manner, said pin 81 having a ring intermediate its ends, which ring engages the face of the mounting plate 20 when the pin 81 is secured to the said plate 20. The pin 81 has its free end enlarged so as to provide a flange 82, and the leaf spring 77 has its body portion 83′ intermediate its ends arcuate shaped, and is adapted to engage that portion of the pin 81 between the ring

engaging the plate 20 and the flange 82 of said pin 81, the said flange 82 preventing the spring 77 from moving vertically on the pin 81. The pin 81 is secured in the plate 20 at such proximity to the rotor elements K and K′ that the spring 77 is held in its mounted position as shown in Figs. 7 and 8 by the spring tension of said leaf spring 77, due to the fact that the ends of the spring 77 engage the members 36 of the rotor elements K and K′ and the pin 81 engages the back of the spring 77 at its arcuate shaped portion 83′.

When the rotor element K or K′ is rotated from one position to another, a snap action of the rotor element is effected in this manner, the end of the leaf spring 77 associated therewith will ride over the end of one of the teeth of the member 36 then engaging the end of said spring, and when the center of the curved portion of the end of said spring 77 has passed beyond the end of the tooth the rotor element will be forced the rest of the way by spring tension until the curved end of the spring 77 engages the next adjoining tooth, whereby the rotor element is held in this position by the spring 77 resting between and engaging a pair of teeth. In order to operate the locking plate LP to lock the rotor elements K and K′ in certain positions against rotation, I provide an ordinary pin tumbler lock T which is secured between the front and back parts of my switch in a manner to be described later, and at this time I will describe how the pin tumbler lock T controls the movement of the locking plate LP. A pin 83 is suitably secured to the rotatable lock barrel of the tumbler lock T and is adapted to engage an extension 84 of the locking plate LP. When the rotor elements K and K′ are in the position as shown in Figs. 7 and 8 and the locking plate LP is to be moved into its locking position to lock the rotor elements K and K′ in position against rotation, the key R which engages the lock T is rotated to the right to cause the pin 83 to make a complete circle so as to bring it into engagement with the face 85 of extension 84, whereby said pin 83 will move the locking plate LP about its pivot 69 to cause its ears 65 and 66 to engage the slots 67 and 68 respectively, and when the said ears have engaged said slots as illustrated in Fig. 8, the key may be removed from the tumbler lock T. Should it be desired to unlock the rotor elements K and K′, the same may be accomplished by inserting the key R into the lock T and turn it to the left, which will cause the pin 83 to disengage the face 85 of the extension 84 and will bring the said pin 83 into engagement with the face 86 of the extension 84, whereby the locking plate LP will move about its pivot pin 69 to cause the flanges 65 and 66 to disengage the slots 67 and 68 as illustrated in Fig. 7, which will permit the rotor elements K and K′ to be rotated. When the rotor element K or K′ is rotated out of its normal or locking position, the key R cannot be removed, for in this case the ears 65 and 66 of LP will engage the faces 71 and 72 of members 36, which will prevent the locking plate from being rotated about its pivot sufficiently far to permit the removal of the key R from the lock T, and when the operator is unable to remove the key R he will know that the ignition circuit is closed or that the circuit of certain lights are closed which should not be closed, and he will cause the operation of the rotor elements K or K′ by operating L or M accordingly to permit the removal of the key, which will be when the rotor elements K or K′ are in their locking position.

Having described the construction of the various parts of my invention and the manner in which some of them operate, I will now describe the manner in which the front and back parts of my switch are secured together to form a single operating unit and also the manner in which the tumbler lock T is secured in my switch.

A suitable opening 90 is provided in the mounting plate 20 and is of a size to receive the reduced end 91 of the rotatable lock barrel 92 of the tumbler lock T so as to bring the pin 83 into operative relation with the extension 84 of the locking plate LP. The casing 93 of the tumbler lock T is provided with a bifurcated portion to form ears 94. An enclosing and separating band member 95, which is made of suitable metal is provided and is of a size to fit on the outer edge of the mounting plate 20, the said band member 95 having a pair of inwardly extending ears 96 and 97 integrally formed therewith and each provided with an orifice, and the enclosing member 95 is also provided with a pin 98 suitably secured to said member 95 and extends inwardly and is adapted to engage and rest between the ears 94 of the casing 93 of lock T to prevent rotary movement of said casing 93. The front cup-shaped mounting member 1 carrying the studs 7 and operating levers of the switch units L and M is now brought into engagement with the member 95, the cup-shaped portion of plate 1 being of a size to just fit into the opening in the band member 95. The end 105 of the rotatable lock barrel 91 extends through the opening in the ferrule 18 until the turned over end of the said member 18 engages the end of the casing 93. The studs 7 extend through the openings in the ears 96 and 97 of the band member 95 and protrude through suitable orifices in the mounting plate 20. The cylindrical end portions 15 of the levers of the switch units L and M will engage the central openings in the supporting studs 21, and the rectangular

portion 14 of the levers of the said switch units L and M fit into the slots 26 provided in the enlarged ends 25 of the members 24 of the rotor element K' and K. The cup-shaped mounting plate 1 and the mounting plate 20 having the member 95 interposed are secured together in this assembled position as set out above by means of the nuts 100, which have screw-threaded engagement with the screw-threaded ends of the studs 7. The studs 7 engaging orifices in the ears 96 and 97 of member 95 prevent the said member 95 from rotating. The pin 98 engaging the ears 94 of the casing 93 of lock T prevents the casing 93 from rotating within the switch when the lock barrel 92 is operated, and the cylindrical member 18 engaging one end of the lock T and the mounting plate 20 engaging the other end of said lock T, the lock T will be clamped in position against displacement.

The various parts of my switch being assembled in the manner described above, the switch as a unit may be mounted on any suitable mounting member such as the dashboard or cowl of an automobile or the like, the outer portion of the mounting plate 1 outside of the cup-shaped portion of said plate 1 being adapted to rest against the face of the dashboard or cowl, or the like, while the rest of the switch protrudes rearwardly through an opening in the dashboard or cowl.

When the switch units L or M are desired to be operated, the operator will insert the key R to operate the locking plate LP to unlock the rotor elements K and K' and when unlocked, the operator will move the switch unit L or M to the position he desires, which will cause the rotor element K or K' associated with the switch unit operating to rotate with the said operating switch unit, to bring the contact springs associated with the rotating rotor element into engagement with the insulation cams 31 and 32 or metallic cam 33, or to bring certain contact springs into engagement with cams 31 and 32, while other springs will engage cam 33 to close a desired circuit. The rotation of the rotor element with the operating switch unit is effected due to the fact that the rectangular portion 14 of the switch unit engages the slot 26 in the enlarged head 25 of the cylindrical member 24 and the cylindrical portion 15 of switch unit engages the central opening in the said member 24, so that when the switch unit is operated, the rotor element will rotate with the rectangular portion 14 to bring the metallic cam and insulation cams of said rotor element in an operative position relative to their associated contact springs, whereby certain desired circuits will be closed. Now, should the operator attempt to remove the key R while the rotor elements are in their unlocked position, he will be unsuccessful, which will apprise him of this fact, and he will then operate the switch units L or M accordingly to cause the rotor element associated therewith to assume its locking position, whereupon the operator is enabled to withdraw the key from the tumbler lock T.

While I have described various forms of my invention, it is to be understood that changes and modifications will readily suggest themselves to those skilled in the art, and, therefore, I do not wish to be limited to the exact structure as shown and described, but aim to cover all such changes and modifications as come within the scope and spirit of the appended claims.

What I claim as new and desire to secure by United States Letters Patent, is:

1. In a switch of the character described including a back mounting plate, a pair of supporting studs secured to said mounting plate, a pair of rotor elements rotatably supported by said pair of studs, said pair of rotor elements provided with transverse slots in their one end, a front mounting plate, a pair of rotatable members rotatably secured in said front plate, said pair of rotatable members having a rectangular portion for engaging the transverse slots in said rotor elements so that when said rotatable members are operated the said rotor elements are caused to rotate, and a locking plate pivotally supported on said back mounting plate for locking said rotor elements and rotatable members against rotation.

2. In a switch of the class described including a back mounting plate, a stud mounted thereon, a rotor element having a slot provided in its one end rotatably supported on said stud, a front plate, an operating member rotatably secured in said front plate, said operating member adapted to engage said rotor element and having a portion of its body shaped to fit into said slot in said rotor element for causing said rotor element to rotate when said operating member is operated, locking means pivotally secured on said back mounting plate and in operative relation with said rotor element for locking said rotor element against rotation, a member for enclosing said rotor element, stud and locking means, and means secured to said front plate for securing said front plate to the said back plate, said enclosing member being interposed between said plates.

3. In a switch of the class described including a back mounting plate, a supporting stud having a central opening secured thereto, a circuit closing member rotatably supported on said stud and adapted to rest in different positions, said member having a groove in its one end, a spring member for effecting a snap action of said circuit closing member and for holding the same in any of its resting positions, an actuating member

having its one end adapted to engage the central opening in said supporting stud, and also having a portion of its body shaped to engage the said groove in the end of said circuit closing member so that when said actuating member is actuated the circuit closing member is caused to rotate from one of its positions to another position, and a locking plate pivotally supported on said back mounting plate for locking said circuit closing member against actuation.

4. In a switch of the class described including a mounting plate, a hollow stud secured thereto, a rotor actuating member having a central opening for fitting over said hollow stud, said rotor actuating member having a slotted portion at its end extending above said hollow stud, an actuating member having its one end adapted to engage said hollow stud and also having a portion of its body adjacent to its said one end shaped to fit into the slot of said rotor actuating member whereby said actuating member is caused to rotate when said actuating member is actuated, and contact springs operatively associated with said rotor actuating member for closing circuits through said rotor actuating member.

5. In a switch of the class described including a mounting plate, a hollow stud secured thereon, a rotor element having a central opening for receiving said hollow stud, said rotor element provided with a slot in its one end, a plurality of contact springs secured to said mounting plate in operative engagement with said rotor element, and adapted to close circuits through said rotor element, an actuating member adapted to engage said hollow stud and to also engage the slot in said rotor element whereby said rotor element and said actuating member operate as a unit, and locking means pivotally secured to said mounting plate for locking said unit against actuation.

6. In a switch of the class described including a back mounting plate, a plurality of contact springs secured thereto, a rotor element rotatably supported on said mounting plate and adapted to assume different positions to close circuits through said contact springs, a cup-shaped front mounting plate, a designating plate, for designating the position assumed by said rotor element, adapted to fit into said cup-shaped mounting plate, a transparent plate for fitting into said cup-shaped mounting plate to engage said designating plate, said plates being provided with openings, and cylindrical members for engaging said openings and having their ends turned over to secure said plates together as a unit.

7. In a switch of the class described including a back mounting plate, circuit closing elements rotatably supported on said mounting plate, a locking member pivotally supported in said mounting plate for locking said circuit closing elements against rotation, a front plate for said switch having actuating members rotatably secured therein for actuating said circuit closing elements, a cylindrical member for enclosing said elements, means for securing said front plate to said back mounting plate with said cylindrical member interposed to separate said front plate from said mounting plate, a tumbler lock for controlling said locking member secured in openings in said front plate and mounting plate against endwise movement, and means secured in said cylindrical member for engaging said tumbler lock to hold said lock in position against rotation.

8. In a switch of the class described including a back mounting plate and a front mounting plate, circuit closing elements rotatably supported on said back mounting plate, a locking member rotatably supported on said back mounting plate for locking said elements against actuation, a member for enclosing said elements and said locking member clamped between said front and back mounting plates, a tumbler lock for controlling said locking member having its one end engaging an opening in said back mounting plate and its other end engaging an opening in said front mounting plate whereby said lock is secured between said mounting plates against endwise movement, and a pin secured in said enclosing member for engaging said tumbler lock to prevent rotation of the casing of said lock.

9. In a switch of the character described including a back mounting plate provided with an orifice, circuit controlling elements rotatably supported on said mounting plate, locking means rotatably supported on said mounting plate for locking said elements in certain positions against rotation, a front mounting plate for said switch provided with an opening, a cylindrical member clamped between said front and back mounting plates, a lock for controlling said locking means, said lock comprising a casing and a rotatable lock barrel, one end of said rotatable lock barrel engaging the orifice in said back plate and its other end engaging the opening in said front plate, whereby said lock is secured between said mounting plates against endwise movement, and a pin secured in said cylindrical member for engaging said casing to prevent the rotation of said casing when said lock barrel is rotated.

10. In a device of the character described including a front and back mounting plate, each provided with an opening, a rotor element rotatably supported between said mounting plates, a rotatable locking member for locking said rotor element against rotation, a lock for controlling said locking member, said lock comprising a casing and a rotatable lock barrel, the ends of said lock

barrel rotatably engaging the openings in said mounting plates whereby said lock is supported in and secured between said mounting plates against displacement, and a pin for engaging said lock casing to prevent rotation of said casing when said lock barrel is rotated.

11. In a device of the class described including a mounting plate, a pair of rotor elements rotatably supported thereon and adapted to be rotated and rest in different positions, a leaf spring having its end portions shaped to engage said rotor elements to hold the same in their resting positions and to give a snap action to said rotor elements when said elements are rotated, said leaf spring having an arcuate shaped body portion intermediate its ends, and a pin secured to said mounting plate for engaging said arcuate shaped portion to effect spring tension of said spring whereby said spring is maintained in operative engagement with said rotor elements.

12. In a device of the class described including a mounting plate, rotor elements rotatably supported thereon and adapted to rest in different positions, a leaf spring having its ends engaging said rotor elements to hold said elements in their resting positions, and a pin secured to said plate for securing said spring in operative relation with said rotor elements.

13. In a device of the class described including a mounting plate, rotor elements rotatably supported thereon, a spring for holding said elements in position, a pin for securing said spring in operative relation with said rotor elements, means integrally formed with said spring to engage said pin to prevent endwise movement of said spring, and means integrally formed with said pin to prevent vertical movement of said spring.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 13th day of December, 1922.

WILLIAM KAISLING.