W. KAISLING.

IGNITION AND LIGHTING SWITCH FOR AUTOMOBILES.

APPLICATION FILED OCT. 4, 1915.

**1,360,411.**

**Patented Nov. 30, 1920.**

2 SHEETS—SHEET 1.

Fig. 7.

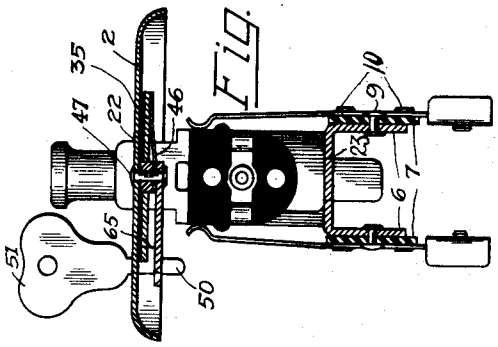



Fig. 3.

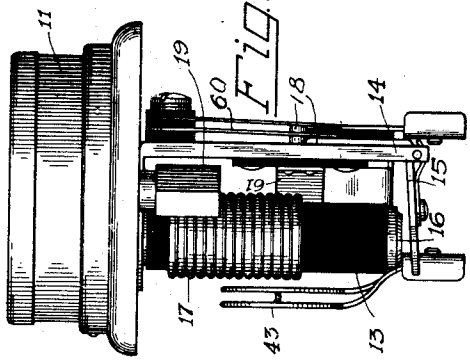



Fig. 8.

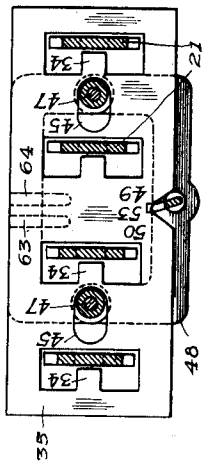



Fig. 1.

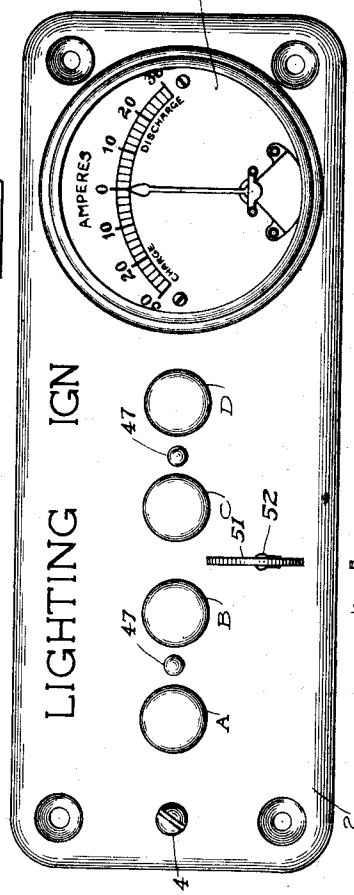
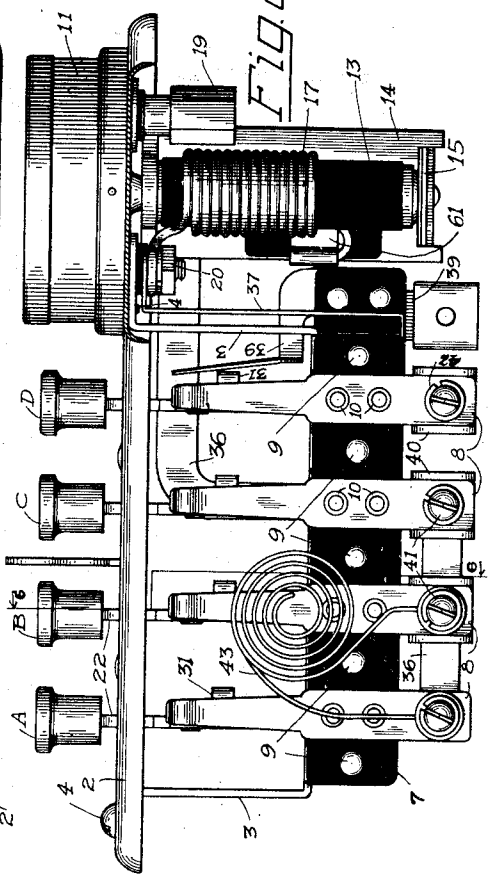



Fig. 2.

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2 SHEETS—SHEET 2.

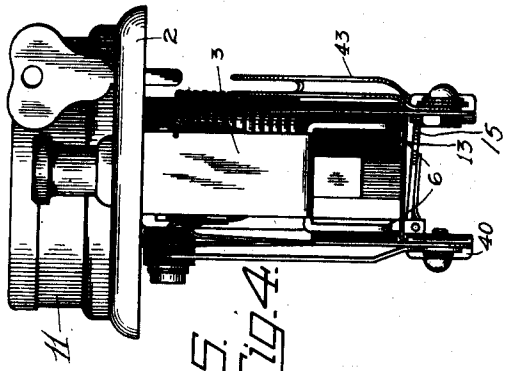

Fig. 4.

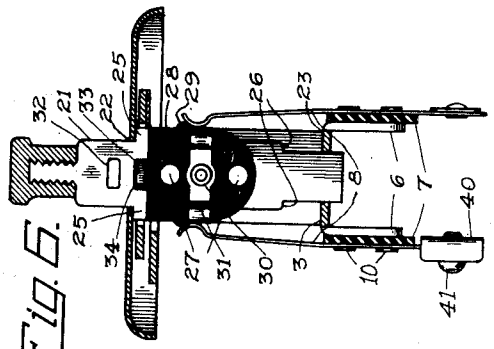

Fig. 6.

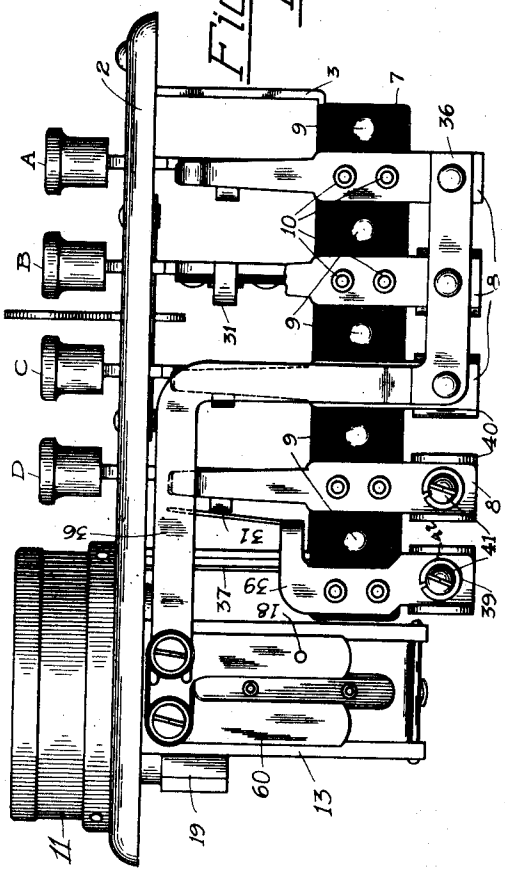

Fig. 5.

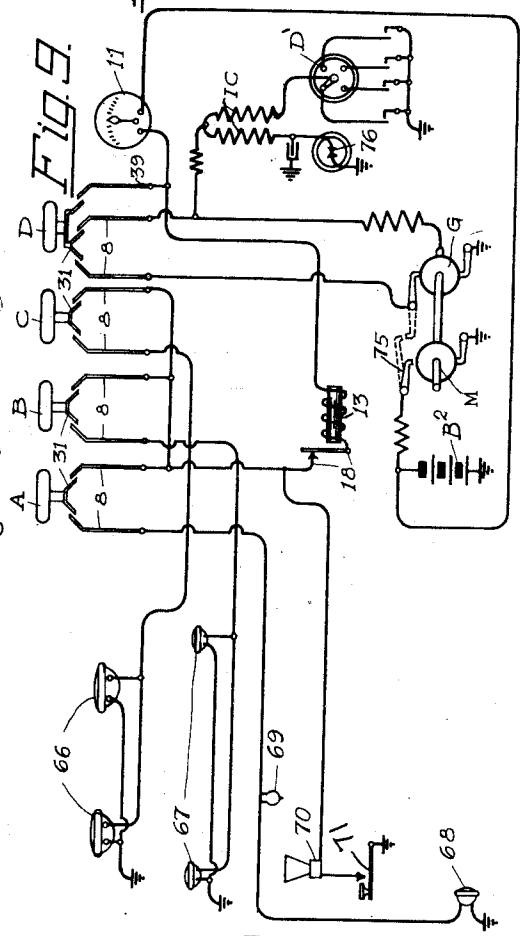

Fig. 9.

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# UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## IGNITION AND LIGHTING SWITCH FOR AUTOMOBILES.

1,360,411. Specification of Letters Patent. Patented Nov. 30, 1920.

Application filed October 4, 1915. Serial No. 53,991.

*To all whom it may concern:*

Be it known that I, WILLIAM KAISLING, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Ignition and Lighting Switches for Automobiles, of which the following is a specification.

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 being constructed more particularly for use in connection with ignition and light circuits for automobiles. It is an object of my invention to produce an improved device of the class described which embodies desirable features and advantages all in a simple, efficient, and economical manner; and to the accomplishment of this object and such others as may hereinafter appear, the invention consists in novel details of construction, parts, and combinations of parts hereinafter described, and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming a part hereof in which the same reference characters indicate like parts throughout the several views and in which—

Figure 1 is a top view of my combination switch;

Fig. 2 is a side elevation of Fig. 1;

Fig. 3 is a right elevation of Fig. 2;

Fig. 4 is a left elevation of Fig. 2;

Fig. 5 is a side elevation of Fig. 1; viewed from the side opposite to that shown in Fig. 2;

Fig. 6 is a sectional view along line 6—6 of Fig. 2, showing the plunger in its operative position, looking in the direction of the arrow indicated in connection therewith;

Fig. 7 is another sectional view of Fig. 2, showing the manner in which the locking mechanism operates to lock the plunger in either a normal or an off-normal position;

Fig. 8 is a top view of my switch showing the plungers and coöperating locking mechanism with the cover plate removed;

Fig. 9 shows a circuit arrangement adapted to operate with the type of switch shown in the other figures.

I have preferably provided three independently operable switch operating members or plungers A, B, C, for controlling the lighting circuits and a switch operating plunger D for controlling the ignition circuits, together with the locking mechanism F, although it will be apparent that the number of plungers may be varied.

Referring more in general to the form illustrated in Fig. 2, the switch members A, B, C and D, have operative and non-operative positions, they being shown in their non-operative position. The locking device F is preferably arranged to lock the plungers A, B and C in their operative or non-operative position, this arrangement being preferred on account of their use in connection with lighting circuits on the automobile whereby the different circuits may be locked in their operative or non-operative conditions. As to switch D, I preferably arrange it to be locked in an inoperative position only, this being preferable in order to prevent an operator from locking this switch in an operative position by mistake when leaving the car.

Referring now more in detail to the switch construction, it consists of a top plate 2 which forms the main mounting member for the other parts of the switch. A U-shaped mounting strip 3 is firmly secured to the top plate 2 by means of the screws 4 and is provided with integrally formed dependent ears 6 to which are secured strips of insulation 7. To the strips of insulation 7, between the said dependent ears 6, are riveted the switch springs 8, the strips of insulation 7 being riveted to the dependent ears 8 by means of rivets 9, while the switch springs 8 are riveted to the strips of insulation 7 by means of rivets 10. A pair of switch springs 8 are provided for each of the operating plungers. Secured to the top of the mounting plate is an ammeter 11 which may be of any suitable type, and is used for showing the amperage of the current that is being taken from or applied to battery $B^2$, as will hereinafter be more particularly explained. Mounted directly beneath the ammeter and secured to the top plate, is an overload relay 13 which comprises a heel piece 14, an armature 15, a core 16, a winding 17, a pair of control contacts 18, and a tension spring 60. The function of this relay will be hereinafter more fully explained. The ammeter is provided with a pair of terminals 19 and 20 insulatingly secured to the mounting plate 2, the

terminal 20 passing through one limb of the mounting strip 3. One terminal of the coil of the overload relay is connected to terminal 20 of the ammeter and the other terminal is connected to a strip 61 forming the lower contact of the pair of contacts 18.

Referring to Fig. 6, each plunger comprises a movable plate member 21 slidably mounted in slots 22 and 23 in the top plate 2 and in the mounting strip 3 respectively. Formed integrally with plate 21 are ears 25 which coöperate with the top plate 2 to limit the movement of the plunger in one direction while the integrally formed shoulders 26 coöperate with the mounting strip 3 to limit the movement of the plunger in the opposite direction. Securely riveted to the slidable member 21 by means of rivets 27 is the insulating plate 28 provided with integrally formed ears 29. The ears 29 coöperate with the springs 8 to yieldingly hold the plunger in its different positions. Secured to the insulating member 28 by means of a rivet 30 is a conductor strip 31 for effecting connection between the said springs 8. Each of the plungers A, B, C, are provided with a rectangular slot 32 adapted to receive the ears 34 of the locking bar 35 when in a non-operative position and are provided with a rectangular slot 33 adapted to receive the ears 34 of the said locking plate 35 when in an operating position. The plunger D is provided with a rectangular slot 32 for locking it in its non-operative position, but is not provided with a slot 33 for locking it in its operating position. When a plunger is in its non-operative position the switch springs 8 contact with the strip of insulation 28 while when a switch is in its operating position the conducting strip 31 conductively connects the switch springs 8 to thereby close circuit connections.

An angular strip 36 is provided to connect one spring of the pair of switch springs 8 of the switches A, B and C, to the upper contact of the pair of contacts 18 controlled by the overload relay 13. A second angular strip 37 connects one terminal of the overload relay and of the ammeter, to a switch spring 8 of the ignition switch D. A spring member 39 is secured to one of the insulating strips 7 by means of rivets and is adapted to make contact with the conducting strip 31 of the plunger D in either its operating or non-operating positions and is adapted to be flexed outwardly when the plunger D is moved from its non-operative to its operating position. A U-shaped terminal member 40 is provided for each of the switch springs 8 to which an electrical conductor is to be connected. A screw 41 is provided with a lock washer 42 for securely holding an electrical conductor between the switch spring 8 and the contact surface of the said U-shaped member 40.

A resistance coil 43 is shown connected to the switch springs 8 of plungers A and B. This resistance coil is for use in circuit arrangements where it is desirable to cut down the current, and thereby dim the lamps of any of the lighting circuits.

The lock mechanism comprises an endwise slidable lock bar 35 mounted directly below the top plate 2 and is provided with slots 45 which coöperate with the rivets 47 for guiding its movement. A U-shaped spring member 46 is secured to the mounting plate 2 by means of the said rivets 47 and yieldingly holds the locking plate 35 against the under side of the top plate 2. The said spring is provided with a ridge for coöperating with the grooves 63 and 64 in the lock bar 35 to yieldingly hold it in its locked and unlocked positions. A similarly shaped strip member 48 is also secured to the top plate 2 by means of the said rivets 47 and is provided with a circular hole 49 for receiving the end portion 50 of the key 51. The locking plate 35 is provided with a V-shaped slot for cooperating with the key 51. When it is desired to lock a plunger against actuation, the key 51 is inserted in the top plate 2 which forms an escutcheon plate for the key and is turned in a clockwise direction, the part 65 of the key coöperating with the V-slot in the locking bar 35 and moving the integrally formed locking ears 34 into the slots 32 and 33 of the plungers, depending upon which position the said plungers are in. If an attempt is made to lock the plungers when the switch plunger D is in an operating position, the ear 34 of the locking plate 35 will engage member 21 of the switch D and prevent the locking plate 35 from moving to a locking position, thus notifying the operator that the switch D is off normal. Assuming that the lock mechanism is in a locked position and it is desired to unlock the plungers, the key is inserted as before and turned in a counter-clockwise direction, the locking bar being this time moved to the left and the locking ears 34 of plate 35 withdrawn from the cooperating slots 32 and 33 of the plungers, thus unlocking the plungers so that they may be moved to either of their positions.

Referring more particularly to Fig. 9, I have shown a circuit arrangement adapted to coöperate with a switch device of the character hereinbefore described. I show a pair of head lights 66, the circuits of which are controlled by the plunger member C and includes the storage battery $B^2$. The side lamps 67 are controlled through the medium of the plunger member B, and the rear light 68 and cowl lights 69 are controlled by the plunger member A. The electric horn 70 also receives current from the storage battery $B^2$ and is operated by the push button 71, preferably mounted on the steering gear.

The overload vibratory relay 13 is so arranged that whenever an excessive amount of current is drawn through the said relay it attracts its armature and opens its circuit. However, it again immediately releases its armature and acts as a buzzer to notify the operator of the car that there is a ground or some other defect in the lighting circuit which needs attention.

When it is desired to start the engine of the car, the switch plunger D is operated to connect current from battery $B^2$ to the brush of the generator G, to the field of the generator G and to the induction coil IC. The operator then operates the lever 75 to close a circuit through the motor M and to open the circuit of the generator G. The motor M is mechanically connected to the crank shaft of the engine and operates to spin the motor until it starts to operate under its own power. The rotation of the gas motor causes the timer contact 76 to be opened and closed and the distributer D′ to close the secondary circuits of the spark plugs in a well known manner. When the gas motor starts rotating under its own power, the operator releases the lever 75, thereby opening the circuit of the motor M and closing the circuit of the generator G, which now generates current and charges the storage battery $B^2$, providing the speed of the generator is such as to furnish more current than is necessary for ignition and lighting purposes. The ammeter 11 is so arranged as to show whether the current being generated by the generator G is in excess or less than the current being consumed by the engine and lights.

While I have illustrated one specific circuit arrangement, I do not wish to be limited to such, as various other circuit arrangements may be used in connection with a combination switch of the class hereinbefore described. My improved combination switch carries all of the plungers together with the dimming resistance, ammeter, overload vibratory relay and locking mechanism upon one mounting plate which may be readily mounted in any convenient place upon the car. I have so constructed the various parts of my switch that each part of it can be stamped out of a sheet of material, thus doing away with unnecessary labor in making the different parts, but still producing a very economical but efficient and strongly built switch.

From what has been described the combination of my improved device will be readily apparent to those skilled in the art, and it will also be clear that many changes and modifications may be made without departing from its spirit. Therefore, I wish to cover all that comes within the spirit and scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by United States Letters Patent, is—

1. A switch device including a front plate, a plurality of plungers carried by said front plate, a slidable locking plate carried by said front plate for locking said plungers against actuation, a pair of slots cut in said locking plate, a pair of pins secured to said front plate and extending through said slots to guide the movement of the said locking plate, grooves cut in said locking plate, and a spring fastened to said pins for coöperating with said grooves to maintain said locking plate in either of its positions.

2. A switch device comprising a mounting plate, a mounting strip secured to said mounting plate and provided with integrally formed dependent ears, strips of insulating material fastened to said dependent ears, switch springs secured to said strips of insulating material, a movable switch plunger having bearing surfaces in said mounting strip and in said mounting plate, integrally formed shoulders for said plunger for limiting the movement thereof, a strip of insulating material secured to said switch plunger, and integrally formed ears for said strip of insulating material to coöperate with said switch springs to maintain said switch plunger in either of its positions.

3. A switch device including a front plate, a plurality of plungers carried by said front plate, a slidable locking plate carried by said front plate for locking said plungers against actuation, a pair of slots cut in said locking plate, a pair of pins secured to said front plate and extending through said slots to guide the movement of the said locking plate, grooves cut in said locking plate, a spring fastened to said pins for coöperating with said grooves to maintain said locking plate in either of its positions, and a strip connected to said pins having an orifice into which the key for moving said locking plate fits.

4. A switch device including a front plate, a mounting plate secured thereto, strips of insulating material secured to said mounting plate, switch springs fastened to said strips of insulating material, a switch plunger mounted between said front plate and said mounting plate, a piece of insulating material secured to said switch plunger, integrally formed projecting ears on said piece of insulating material, a strip of conducting material secured to said piece of insulating material, said ears coöperating with said switch springs to maintain said plunger in either its operated or its normal position and to prevent displacement of the said strip of conducting material.

5. A switch device of the character described including a mounting plate, a mounting strip secured to said mounting plate, a movable switch member having bearing sur-

faces in the said mounting plate and in the said mounting strip, a strip of insulating material secured to said movable switch member, a conducting strip secured to said strip of insulating material, ears provided for said strip of insulating material for preventing said conducting strip from becoming displaced, a pair of switch springs adapted to be electrically connected by said conducting strip, and an auxiliary spring attached to one of said strips of insulating material for coöperation with said conducting strip.

6. A switching device including a front plate, a mounting strip secured to said front plate and provided with dependent ears, strips of insulating material fastened to said dependent ears, switch springs secured to said strips of insulating material, a plurality of operating plungers extending through the said front plate into said mounting strip, a plate of insulating material secured to each of said plungers, an elongated conducting strip secured to the plate of insulating material on each of said plungers, projecting ears for each of said plates of insulating material for preventing its associated strip of conducting material from becoming displaced and for engagement with the switch springs associated therewith, and operating buttons for moving said plungers outward and inward, thereby moving said conducting strips into and out of relation with said switch springs.

7. A device of the character described including a front plate, a U-shaped mounting strip secured to said front plate, integrally-formed dependent ears for said mounting strip, a pair of strips of insulating material rivetally secured to said dependent ears, upwardly extending switch springs rivetally secured to said strips of insulating material, the free extremities of said switch springs having their ends semi-circular in form, a switch plunger slidably secured in said front plate and mounting strip, integrally formed ears for said switch plunger for limiting the movement thereof, a plate of insulating material rivetally secured to said switch plunger, projecting ears of said plate of insulating material for coöperation with the rounded off extremities of said switch springs to maintain the switch plunger in either its normal or its operated position, and an auxiliary switch spring rivetally secured to one of said strips of insulating material for coöperation with a conducting member rivetally secured to said plate of insulating material.

8. A switch device including a front plate, a mounting strip secured to said front plate, switch actuating plungers movably supported by said front plate and said mounting strip, a slidable locking plate located immediately below said front plate, slots cut in said locking plate, a pair of pins extending through said slots to guide the movement of said locking plate, depressions cut in said locking plate, a spring secured to said pins provided with a projecting portion for coöperation with said depressions to maintain said locking plate in either of its positions, a strip secured to said pins provided with an orifice into which a key projects for moving said locking plate, integrally-formed dependent ears for said mounting strip, a pair of strips of insulating material secured to said ears, switch springs secured to said strips of insulating material, and conducting members insulatingly secured to said plungers for electrically connecting said switch springs.

9. A switch device comprising a mounting frame, strips of insulating material carried by said mounting frame, diametrically opposed switch springs fastened to said strips of insulating material, a movable switch element carried by said mounting frame, a plate of insulating material fastened to said switch element, a conducting element secured to said strip of insulating material for coöperation with said switch springs, and an auxiliary switch spring secured to one of said strips of insulating material normally in engagement with said conducting element and adapted to remain in engagement therewith when said movable switch element is operated to electrically connect said switch springs, whereby said auxiliary switch spring and said diametrically opposed switch springs are electrically connected.

Signed by me at Chicago, county of Cook and State of Illinois, in the presence of two witnesses.

WILLIAM KAISLING.

Witnesses:
G. A. YANOCHOWSKI,
B. O'BRIEN.