C. GRIMES.

ELECTRIC SWITCH.

APPLICATION FILED MAY 26, 1916.

1,232,793.

Patented July 10, 1917.

3 SHEETS—SHEET 1.

Fig. 1.

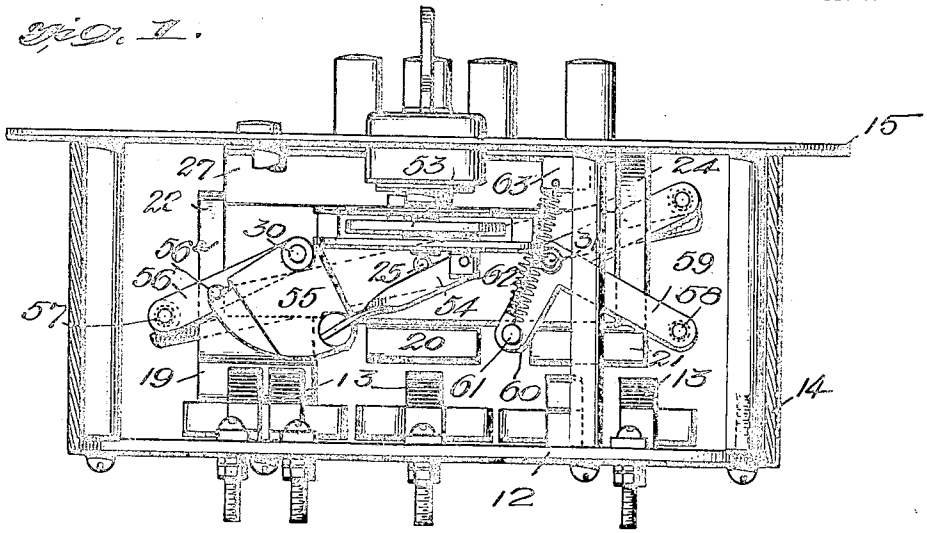
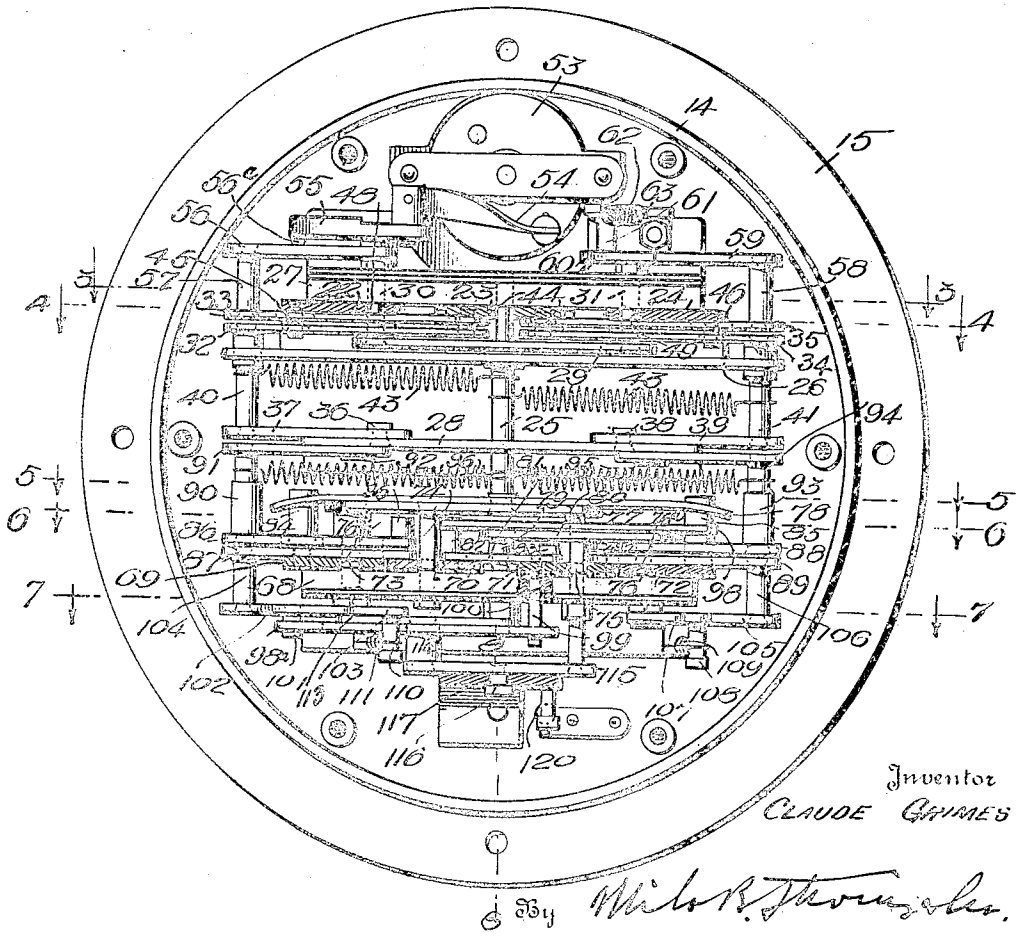


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

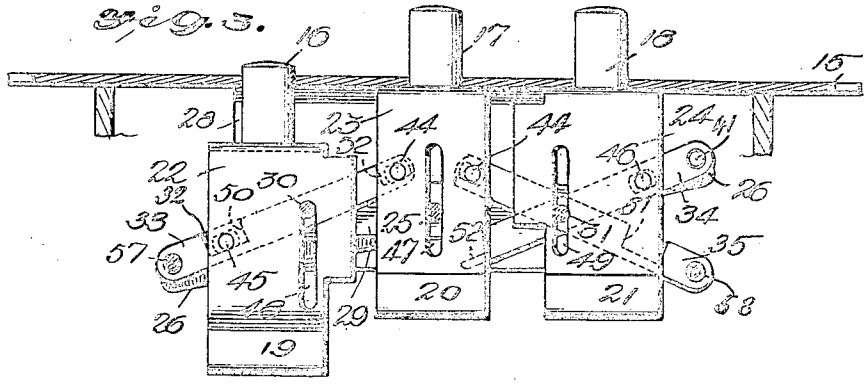


Fig. 4.

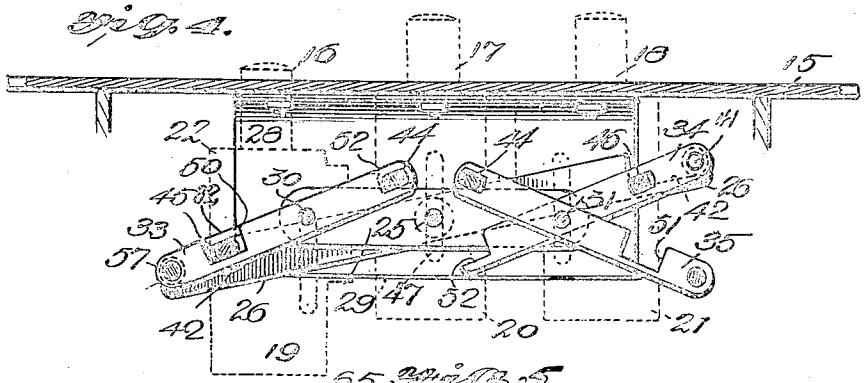


Fig. 5.

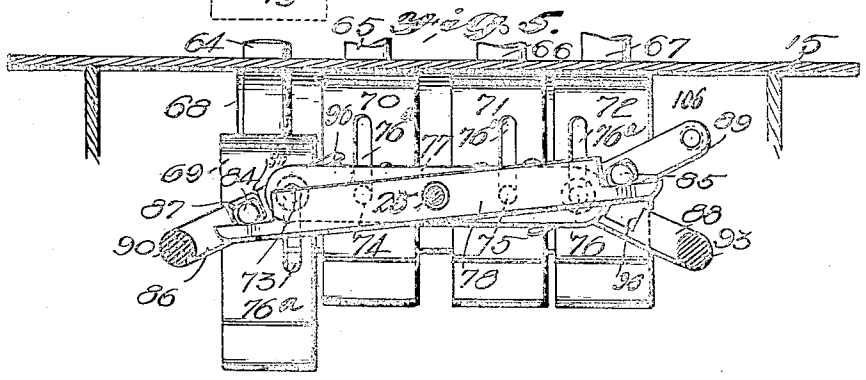
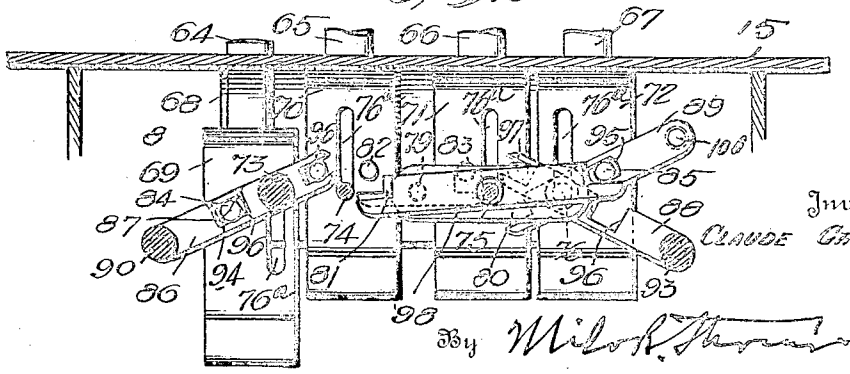


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 9.

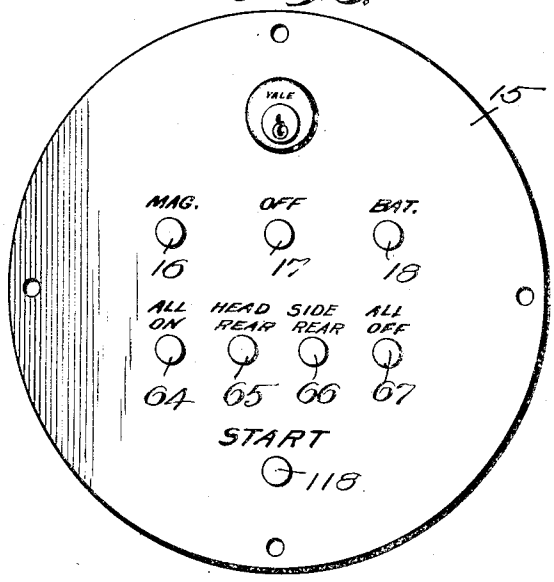


Fig. 10.

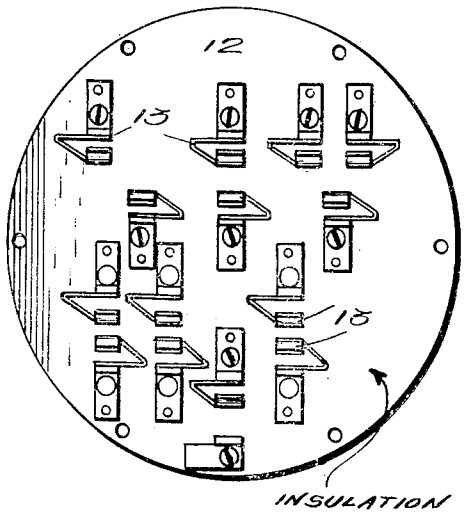


Fig. 7.

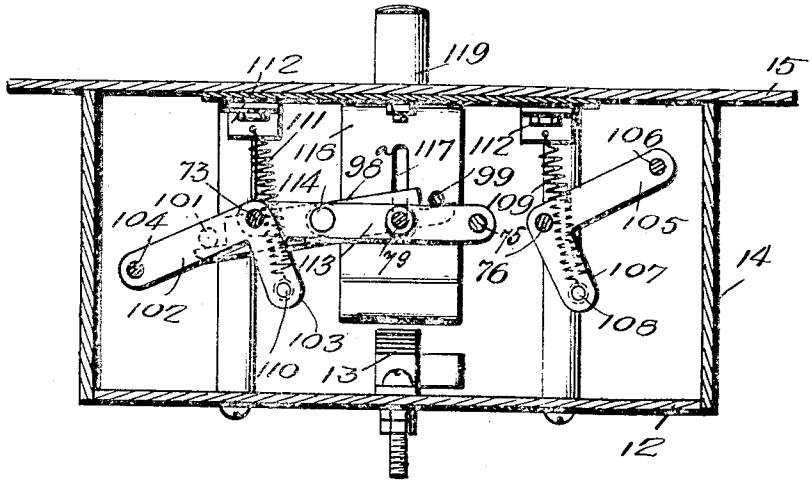
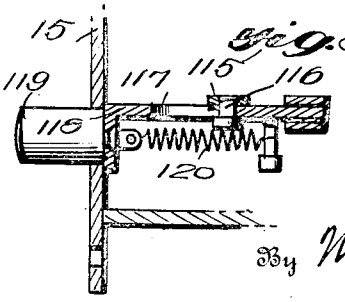


Fig. 8.



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UNITED STATES PATENT OFFICE.

CLAUDE GRIMES, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO EMMA A. ALBRIGHT, OF CHICAGO, ILLINOIS.

ELECTRIC SWITCH.

1,232,793. Specification of Letters Patent. Patented July 10, 1917.

Application filed May 26, 1916. Serial No. 100,044.

To all whom it may concern:

Be it known that I, CLAUDE GRIMES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Electric Switches, of which the following is a specification.

The switch mechanism which is the subject matter of the present application for patent is designed more particularly for use in connection with automobiles and other motor vehicles to control the ignition and the lamp circuits.

In the operation of internal-combustion engines commonly in use on motor vehicles, the current source of the ignition circuit is ordinarily obtained from a battery and a magneto, and the switch mechanism has therefore been designed to cut out the battery when the magneto is thrown in, and vice-versa, the arrangement being such that it will be rendered impossible to throw in both current sources. The mechanism also includes a means for cutting out both current sources.

The switches are of the push button type, provided with connections whereby the hereinbefore described operations are effected.

The invention also includes a switch mechanism for controlling the lighting system of a car having head, side and rear lamps, one push button closing the circuit of the head and rear lamps and another button closing the circuit of the side and rear lamps, with a connection between said buttons so arranged that when one of the circuits is closed, the other one will be broken. Another pair of push buttons is provided for turning all the lamps off or on, these also having connections with each other and also with the first-mentioned pair of switch buttons.

In order that the invention may be better understood, reference is had to the accompanying drawings forming a part of this specification in which—

Figure 1 is an elevation of the mechanism, the casing inclosing the same being broken away;

Fig. 2 is a plan view with the top of the casing removed;

Figs 3, 4, 5, 6, 7 and 8 are cross sections on the lines 3—3, 4—4, 5—5, 6—6, 7—7, and 8—8 respectively of Fig. 2;

Fig. 9 is a face view of the casing showing the several push buttons, and

Fig. 10 is a plan view of the base of the switch on which the contacts are mounted.

Referring specifically to the drawings, 12 denotes a base of insulating material on which are mounted the stationary terminals 13 of the switch, the same being suitably wired to the several circuits to be controlled. Each terminal comprises opposite spring tongues which are spaced so that the coöperating movable switch member may enter therebetween and close the circuit which is controlled by the particular set of terminals, the spring tongues being sufficiently strong to retain the movable switch member therebetween and to prevent its accidental withdrawal.

To the base 12 is secured a suitable casing 14 closed by a top or cover 15 having openings from which the several switch buttons protrude. The switches for controlling the magneto and the battery circuits consist of three push buttons and a corresponding number of stationary terminals 13, these push buttons being indicated at 16, 17 and 18, respectively, and the parts of the latter which make contacts with the terminals being indicated at 19, 20 and 21, respectively, the same being suitably shaped to enter between the opposite spring fingers comprising said terminals. The push button 16 closes the magneto circuit, the push button 18 closes the battery, and the push button 17 breaks both of said circuits.

Adjacent to each of these buttons the face plate or cover 15 of the casing is suitably inscribed to identify the buttons. The button 16 has a shank 22 carrying the part 19, the button 17 a shank 23 carrying the part 20, and the button 18 a shank 24 carrying the part 21.

On a stationary shaft 25 is fulcrumed, intermediate its ends, a main rocking lever 26. The shaft is supported at one end by a plate 27 and adjacent to its other end by a plate 28, these plates being fixed to and extending from the top or face plate 15. Between these plates, there is fixed on the shaft an arm 29 extending from opposite sides thereof. The outer ends of the arm 29 carry pins 30 and 31, respectively which extend across to and through the plate 27. On the pin 30, adjacent to the arm 29 are fulcrumed, intermediate their ends, two auxiliary rocking levers 32 and 33, respectively, and on the pin 31, adjacent to the arm 29 are fulcrumed, intermediate their ends, two auxiliary rocking levers 34 and 35 respectively. To one side of the plate 28, on one side of the shaft 25, is fulcrumed at one end, as indicated at 36, a lever 37, and on the other side of the shaft there is fulcrumed to the plate, at one end, as indicated at 38, a lever 39. The fulcrums of the levers 32 and 37 are in alinement, and the outer ends of said levers are connected by a cross bar 40. The fulcrum of the levers 34 and 39 are also in alinement, and they are connected at their outer ends by a cross bar 41. Thus it will be seen that the levers 32 and 37 swing together as one, this being also true with respect to the levers, 34 and 39. The respective ends of the lever 26 engage the cross bars 40 and 41, said ends being recessed as indicated at 42 for this purpose, so that when the two sets of levers 32, 37 and 34 and 39 are swung in one direction, the lever 26 will also be swung. Coiled springs 43 connecting the shaft 25 and the cross bars 40 and 41 tension the parts so that they remain in the position they are placed and do not accidentally swing back.

The inner ends of the levers 33 and 35 are loosely connected to the shank 23 of the button 17 by a pin-and-slot connection shown at 44 in Figs. 3 and 4 so that they are simultaneously swung when said button is operated. The lever 32, between its fulcrum 30 and its outer end to which the cross bar 40 is connected, has a pin-and-slot connection 45 with the shank 22 of the push button 16, and in a similar manner, the lever 34 is connected to the shank 24 of the push button 18 as indicated at 46.

The button shank 23 has a longitudinal slot 47 to accommodate the shaft 25, the button shank 22 has a slot 48 to accommodate the pin 30, and the button shank 24 has a slot 49 to accommodate the pin 31, these pins and the shaft thus serving as guides for the button shanks, the latter being also guided by being in sliding contact with one side of the plate 27.

The pin 45 extends across the lever 33 between its fulcrum 30 and its outer end, and the pin 46 extends across the lever 35 in a similar manner, and said pins are adapted to engage said levers for a purpose to be presently described, the portions of the levers engageable by the pins having edge recesses indicated at 50 and 51, respectively. The inner ends of the levers 32 and 34 have recesses 52 and are engageable respectively by the pins 44 for a purpose to be presently described.

The drawings show the button 16, pushed in to close the magneto circuit, the push pin 18 being retracted so that its circuit is broken. The push pin 17 is also retracted. Upon pushing the battery button 18 to close the battery circuit the button 16 is retracted to open the magneto circuit. The button 17 operates to retract either buttons 16 and 18, so that when said button 17 is pushed in, both the circuits are broken. Thus it will be seen that there is an operative connection between the "off" button 17 and the buttons 16 and 18, and there is also a connection between the buttons 16 and 18.

Assuming the parts to be positioned as shown in Figs. 3 and 4 and it is desired to cut out the magneto and cut in the battery, then the button 18 is pushed in, whereupon the button 16 is retracted. This operation is effected by the system of connected and correlated levers, the action being as follows:

The movement of the button shank 24, through its attachment 46 with the lever 34 swings the latter, and as the lever 34 is connected to one end of the lever 26 by cross bar 41, said lever 26 is rocked. This motion of the lever 26 is transmitted at its opposite end to the lever 32 through the cross bar 40, and through the connection 45 between the lever 32 and the button shank 22, the button 16 is retracted. The same parts operate in a reverse order to retract the button 18 when the button 16 is pushed in.

Upon pushing in the button 17, the button 16 is retracted, the action being as follows:

The movement of the button shank 23, through the pin 44 swings the levers 32 and 33, and through the connection 45 the button 16 is retracted. If the button 18 has been pushed in, the levers 34 and 35 are actuated to retract the same.

The switch is also provided with a de-

vice for locking the button 17 after it is pushed in, to prevent unauthorized persons from closing the circuits controlled by the buttons 16 and 18, it being understood that the two last-mentioned buttons can not be pushed in when the button 17 is locked in retracted position. This lock consists of a rotatable, key-operated member 53 carried by the face plate 15 and having a pitman connection 54 with a swinging barrier 55 adapted to be swung into the path of a pin 56[a] on the side of a lever 56 fulcrumed at one end on the pin 20 and having at its outer end a connection 57 with the outer end of the lever 33. The outer end of the lever 35 has a side pin 58 whereby it is connected to one branch 59 of an angle lever fulcrumed on the pin 31, the other branch 60 of the lever carrying a side pin 61 to which is connected a spring 62 anchored to a lug 63 mounted on the face plate.

The lock is the subject matter of a companion application, in view of which a further description thereof is not necessary in the present application.

The push buttons for the lighting circuit are shown at 64, 65, 66, and 67. The button 64 turns all the lamps on, and the button 67 turns all the lamps off. The button 65 controls the head light and the rear lamps, and the button 66 controls the side and the rear lamps. An operative connection is provided between these buttons, the buttons 64 and 67 being connected to move in opposite directions, so that the button 64 is retracted when the button 67 is pushed in, and vice-versa. Thus all the lights may be turned off or on by the buttons 64 and 67. The "all on" button 64 is also connected to the buttons 65 and 66, and the "off" button is also connected to the buttons 65 and 66. Thus if the "side and rear" button 66 has been pushed in, to turn on the side and rear lights and the head light is wanted, the button 65 is pushed in, whereupon the button 66 is retracted, the rear lights not being extinguished as the button 65 also controls the same. If all the lights are wanted, the button 64 is pushed in. If either or both sets of lights are to be extinguished, the button 67 is pushed in.

The connections between the push buttons 64, 65, 66 and 67, whereby the hereinbefore described operations are effected comprise the following parts:

On the top or face plate 15 is mounted a plate 68 against one side of which seat the shanks of the buttons, the same being shown at 69, 70, 71 and 72, respectively, and carrying at their outer end contacts to engage the proper spring tongues 13. The plate 68 carries four pins 73, 74, 75, and 76 respectively, which extend from the side thereof against which the button shanks slidably seat, said shanks having slots 76[a] through which the pins extend. Opposite this side of the plate the shaft 25 carries an arm 77 extending from opposite sides thereof, and a lever 78, the shaft end being spaced from the plate. The pins 73, 74, and 75 extend over to the arm 77 and are connected thereto. The plate 68, midway between its ends, also carries a projecting pin 79. A spacer plate 80 connects the pins 79, 75, and 76, the same being located between the plate 68 and the arm 77 to space the movable parts therebetween.

On the pin 79, is fulcrumed, intermediate its ends, a lever 81 having reduced or recessed ends which are in the path of side pins 82 and 83, respectively, on the button shanks 70 and 71, whereby, one of the button shanks is advanced when the other is retracted, and vice versa.

The connection between the buttons 64 and 67 is made by means of the lever 78 and side pins 84 and 85 on the shanks of said buttons, the pin 84 being on the shank 69 and engaging one end of the lever and the pin 85 being on the shank 72 and engaging the other end of the lever. It will therefore be seen that when one of the buttons is pushed in, the other is retracted, and vice versa.

On the pin 73 are fulcrumed, side by side, two levers 86 and 87, respectively, and on the pin 76 are fulcrumed two levers 88 and 89, respectively. The lever 86 is connected by a cross pin 90 to a parallel swinging lever 91 fulcrumed at 92 on the plate 28. The lever 88 is connected by a cross pin 93 to a parallel swinging lever 94 fulcrumed at 95 to the plate 28.

Coiled springs 96 extend between the shaft 25 and the cross pins 90 and 93, these springs having the same function as the springs 43 hereinbefore described.

The pin 84 passes through a slot 94 in the lever 87 to provide a connection between said lever and the button shank 69, and the pin 85 passes through a slot 95 in the lever 89 to provide a connection between said lever and the button shank 72. The levers 86 and 88 have edge recesses 96 to clear the pins 84 and 85. On the button shank 70 is a side pin 96 engaging the inner ends of the levers 86 and 87, the former being forked to straddle the pin; in a similar manner a side pin 97 on the button shank 71 engages the inner ends of the levers 88 and 89. Thus it will be seen that the movement of the button shank 70 is transmitted to the button shank 69 through the levers 86 and 87, and the pin 84 on said shank 69 engaging these levers, and by the same connections the movement of the button shank 69 is transmitted to the button shank 70, said shanks moving in op-

posite directions, so that when one is pushed in, the other moves outward, and vice versa. The button shanks 71 and 72 are also connected to operate together in this manner by the levers 88 and 89 and the pins 97 and 85. The levers 87 and 89 are positively connected to the pins 84 and 85 and the levers 86 and 88 are only engaged edgewise by said pins, in view of which the levers 86 and 87 are free to swing independent of each other, this being also true with respect to the levers 81 and 89.

The operative connection between the button shanks 70 and 72 comprises the following parts:

On the pin 75 is fulcrumed, intermediate its ends, a lever 98 having recessed ends engageable respectively with the pins 82 and 85. Thus when the button shank 70 moves in one direction, the shank 72 moves in the opposite direction. The movement of the button shank 72 is now not transmitted to the button shank 71, as the lever 88 remains stationary, the lever 89 however swinging when the shank 72 moves but not transmitting motion to the shank 71 as its inner end does not reach the pin 97 of this shank in its retracted position. This operation will be understood from an inspection of Fig. 6. The button shank 70 also does not now transmit motion to the button shank 69, the lever 86 swinging idly, and the pin 96 not reaching the inner end of the lever 87 until the end of the inward stroke of the shank 70.

The operative connection between the button shanks 69 and 71 comprise the following parts:

On the side of the plate 68 opposite the side where the hereinbefore described levers are located is mounted a lever 98^a having one of its ends in the path of a pin 99 extending from the shank 71 and working in a slot 100 in the plate 68. The other end of the lever is in the path of a side pin 101 on one of the branches 102 an angle lever having its other branch denoted by the reference character 103. The angle lever is fulcrumed on the pin 73 back of the lever 87, and the latter is connected at its outer end by a cross bar 104 to the outer end of the lever branch 102. Thus it will be seen that the motion of the button shanks 69 and 71 is transmitted from one to the other, through the pin 99, lever 98^a, angle lever 102, 103, connection 104, lever 87 and the pin 84 connecting the last-mentioned lever to the shank 69. The levers 86 and 89 now remain stationary, and the lever 89 swings idly.

On the pin 76, on the same side of the plate 68 as the angle lever 102, 103, is fulcrumed an angle lever having one of its branches 105 connected by a cross bar 106 to the outer end of the lever 89, the other branch 107 of the lever has a side pin 108 to which is connected a spring 109. To the branch 103 of the first described angle lever is connected by a side pin 110 on said branch, a spring 111. The springs 109 and 111 have the same function as the springs hereinbefore described. The springs are suitably anchored to the brackets 112 on the face plate 15.

The pins 73 and 79, on the same side of the plate 68 as the lever 98^a support a plate 115 carrying a pin 114 on which the lever 98^a is fulcrumed. On the same side of the plate 68, the pin 114 and an extension of the pin 75 carry a plate 115 having a side stud 116 seating in the slot 117 of the shank 118 of a push button 119, this button being designed to control a starter, if the car is equipped with one. The push button 119 is held normally protruded by a spring 120, and it has no connection whatsoever with the other buttons.

I claim:

1. A pair of movable members, a connection between said members for transmitting the motion of one to the other in opposite directions, a third movable member, a connection between the first two members and third member for transmitting the motion of the latter to both of the former in an opposite direction, a fourth movable member, and connections between the last-mentioned member and all of the aforesaid members for transmitting the motion of the former to all of the latter in an opposite direction.

2. A pair of movable members, a connection between said members for transmitting the motion of one to the other in an opposite direction, a movable member operatively connected to both of said members, and a movable member operatively connected to all of the aforesaid members.

3. A pair of movable members, a third movable member, a main rocking lever, a pair of auxiliary rocking levers one of which is connected at one end to one end of the main lever and to one of the first-mentioned members, an abutment on the third movable member intercepted by the other end of said auxiliary lever, a connection between one end of the other one of the auxiliary levers and the third movable member, an abutment on the aforesaid first-mentioned member intercepted by the other end of the last-mentioned auxiliary lever, and a pair of auxiliary rocking levers having connections as afore-mentioned with the other end of the main rocking lever.

4. A pair of movable members, a third movable member, a fourth movable member, a rocking lever having connections at its ends with the third and fourth members, a rocking lever having connections at its ends with

the first two members respectively, connections between the third member and both of the first two members, and connections between the fourth member and all of the first three members, said connections transmitting the motions of the members in opposite directions.

5. A pair of movable members, a third movable member, a fourth movable member, a rocking lever having connections at its ends with the third and fourth members, a rocking lever, abutments on the first two members intercepting the ends of said lever, a pair of rocking levers one of which is connected to one of the first two members, said member having an abutment which intercepts the other one of said levers, a pin on the third member connected to the last-mentioned lever, the other lever being intercepted by the pin, an abutment on the other one of the first-mentioned members, a lever having a connection at one end with the last-mentioned lever, and intercepted at the other end by the abutment, a second pair of rocking levers, one of which is connected to one of the first two members, said member having an abutment which intercepts the other one of said levers, a pin on the third member connected to the last-mentioned lever and intercepted by the other lever, an abutment on the other one of the first two members, a lever intercepted at one end by said abutment, and an abutment on the fourth member engageable with the other end of said lever.

In testimony whereof I affix my signature.

CLAUDE GRIMES.