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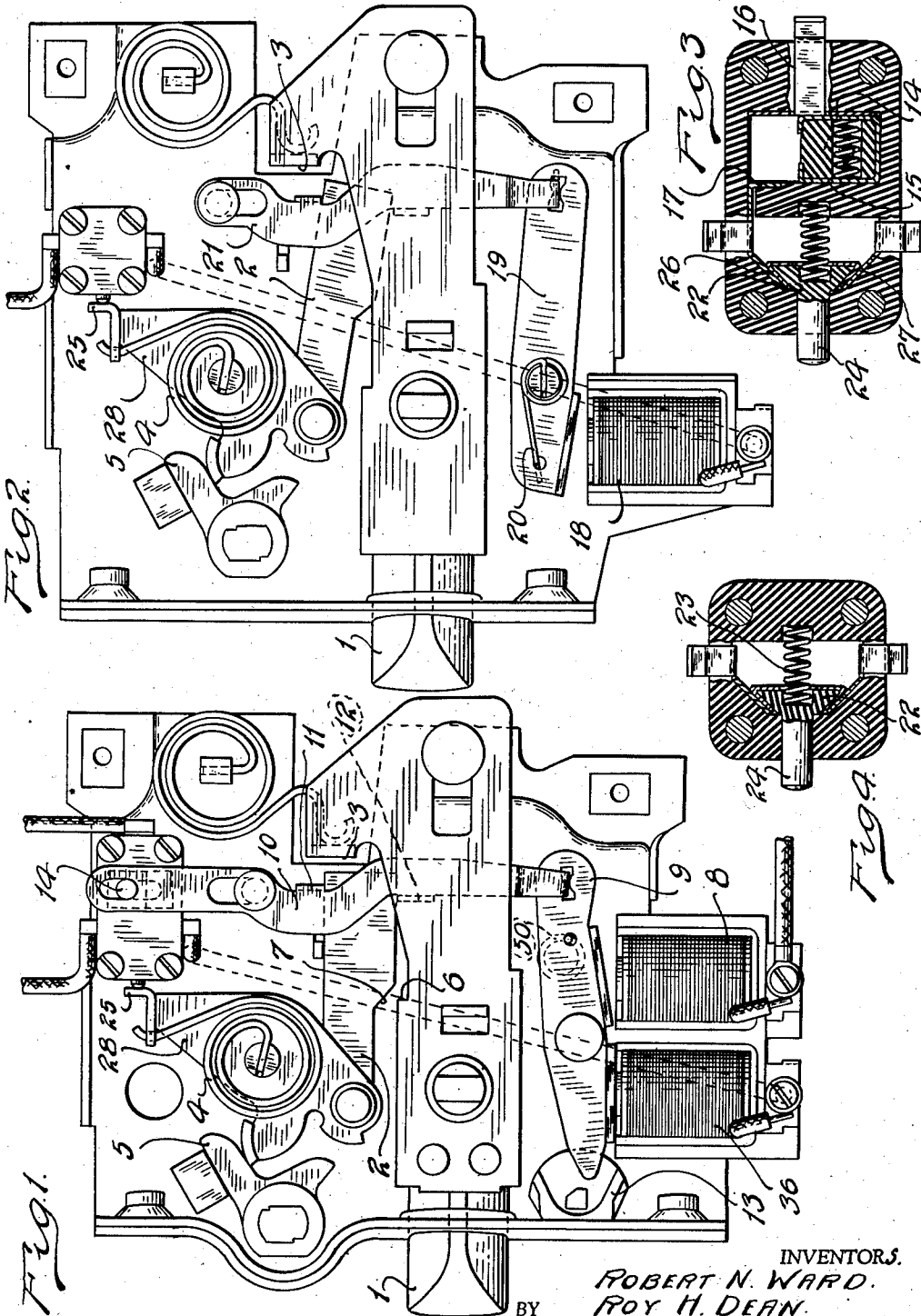
R. N. WARD ET AL

2,329,309

COINCIDENTAL LOCKING SYSTEM FOR AUTOMOBILES

Filed Jan. 21, 1941

2 Sheets-Sheet 1



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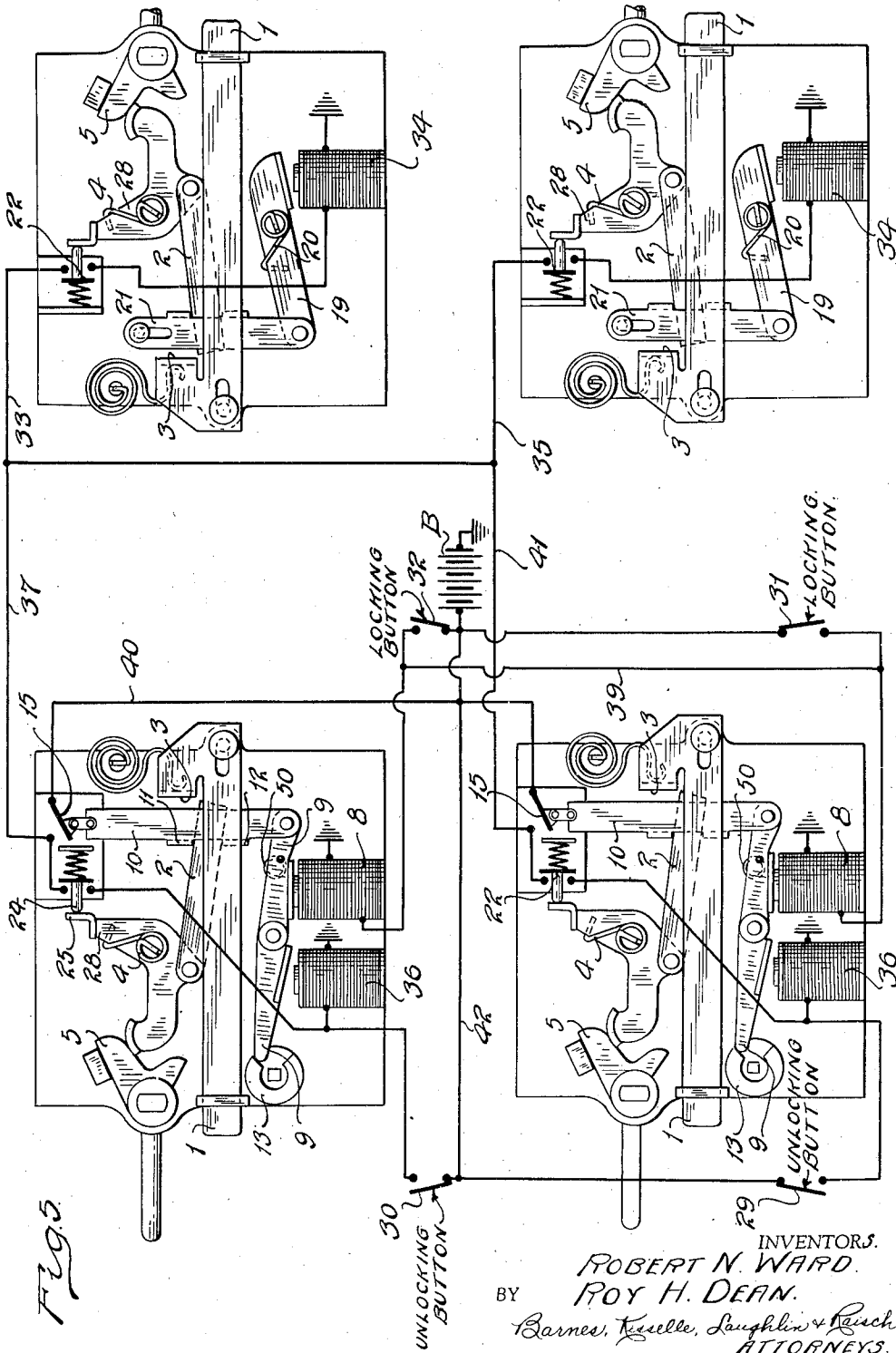
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UNITED STATES PATENT OFFICE

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COINCIDENTAL LOCKING SYSTEM FOR
AUTOMOBILES

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This invention relates to coincidental locking systems and particularly an electrical coincidental locking system. There has long been a demand for a simple effective coincidental locking system for automobile bodies which would do away with the annoyance and trouble of individually securing each door before one leaves the car. Various forms of mechanical and electrical coincidental locking systems have been proposed and patented but the shortcomings and cost of these have, up to the present time, practically forbidden their use.

The present coincidental locking system is an improvement over any that has preceded it for the reason that it can be locked or unlocked by control members on or near each front door and all the locks can be released, including the physical release of the key operated lock by a key on the outside of the door. Furthermore, this can be done with key locks in both front doors. Furthermore, the system is so set up and coordinated that the rear doors are always in locked position but may automatically assume unlocked position when the outside handle is turned and the front door control members are set for the system to be unlocked. This permits the elimination of one solenoid and one circuit in each rear door and simplifies matters. This feature is in itself old and is only new in this general locking setup.

Another feature of novelty resides in a locking system which has an alternately master and subsidiary lock on each front door and a system of this kind which is adaptable to the Andersen and Bowlus type of lock (Patent 2,039,873).

In the drawings:

Fig. 1 is a perspective of the Andersen and Bowlus type of lock equipped with our invention. This shows one of the front door locks.

Fig. 2 shows one of the rear door or subsidiary locks.

Fig. 3 is a detail of the switch used on the front door lock.

Fig. 4 is a detail of the switch used on the rear door lock.

Fig. 5 is a diagrammatic view of the apparatus.

The Anderson and Bowlus type of lock is one in which a bolt 1 can be alternately connected with or disconnected from the outside handle by shifting the thrust or retracting bar 2 from the position shown in Fig. 1 to that shown in Fig. 2. In Fig. 1, the bar is in a position to retract the bolt 1 by engaging the shoulder 3 when the intermediate lever 4 is operated by the roll-back 5.

The new and novel thing about the Andersen and Bowlus lock is that it is provided with a cam arrangement which will, ordinarily, throw the disconnecting member (that is, the retract-

ing bar 2) back into operative or effective position every time the bolt is retracted either by the inside handle or by closing the door. This is effected by the bolt portion 6 striking cam 7 on the disconnecting bar. This is the Ochsner principle (Patent 1,331,166) of always insuring the locking parts being restored to their unlocked position when the bolt is retracted to prevent one from unwittingly locking himself out of the car.

The Andersen and Bowlus invention makes it possible to prevent the Ochsner locking restoration taking place by simply turning the outside handle down when the door is closed. Turning the outside handle down serves to withdraw the cam 7 so far to the rear of point 6 on the bolt that the bar 2 cannot be shifted to its upper position to restore the operating connections. This makes it possible with the door open for one to set the lock on the inside of the door. This setting consists of throwing the retracting bar to its ineffective position (down, as shown in the drawings). The outside handle is then turned down which takes the retracting bar out of the range of the cam and, consequently, the locking remains effective, although the closing of the door does retract the bolt and would, ordinarily, according to the Ochsner locking restoration principle, reestablish the operating connections. This is the type of keyless locking that has been very effective and popular because, while it is possible to lock oneself out of the car, one cannot do it without a great deal of carelessness because he has not only to deliberately set the lock from the inside of the door but, in closing the door, he has to take special pains to turn the handle down to make sure that the door will lock.

We propose to substitute, for the button or mechanical shifting member on the door to be locked, push buttons which will not only shift the retracting bar on the front door either way but will control the retracting bar on all the other doors so as to prepare the locks on these doors to be non-responsive or responsive to actuation by the outside handle. This is done electrically and electro-magnetically.

The front door lock shown in Fig. 1 is now in the unlocked position. Retractor bar 2 is set in position to be effective on the bolt 1. To set it to ineffective position, all that is necessary is to energize solenoid 8 which pulls down armature 9 which, in turn, pulls down link 10 which has a tongue 11 that bears against the top of bar 2 and a tongue 12 which bears against the bottom of bar 2. The spring 50 keeps the armature 9 in either position over center. By shifting the link 10 up and down, the bar may be shifted to effective or ineffective position. It also may be so shifted by the key operated cam member 13.

Assuming the link 10 has been pulled down from the position shown in Fig. 1, the end of the link has a slot in which engages the pin 14. This pin is fastened to the switch block 15 which, as shown in Fig. 3, has one terminal in contact with the conductor 16, while the left hand terminal is out of contact with conductor 17. Hence, this circuit is broken. This is the circuit that leads to all the subsidiary locks and furnishes the power to make the other subsidiary locks effective to retract the bolt when the outside handle is turned, as will be presently described.

The subsidiary locks are of two kinds. One is the opposite front door lock which is exactly like that shown in Fig. 1 and the other two are the rear door locks, if the car be a four-door car. These are locks such as shown in Fig. 2. This is the usual Andersen and Bowlus type of lock but provided with only one solenoid designated 18 and with an armature 19 which is, ordinarily, kept in a position of retreat from the armature by spring 20. This operates to pull down link 21 to the position shown in Fig. 2 where the retractor bar 2 is in the ineffective position. It is always kept in this ineffective position by spring 20 except when solenoid 18 is momentarily energized by means of the turning of the outside handle momentarily closing the switch 22 (Fig. 4) by allowing button 24 to move to the left in response to the pressure of spring 23. Ordinarily, the bridge 22 of the switch that bridges from terminal 26 to terminal 27 is kept away from these terminals by shoulder 25 on lever 4. The clock spring 28, ordinarily, keeps the intermediate lever 4 turned in the clockwise direction and keeps this switch open. But, if the switch 15 on either master lock is closed, then all the subsidiary locks can be made effective to retract the bolt by turning the outside retractor. This operation retracts the intermediate lever 4 in counter-clockwise direction, relieves the pressure on the button 24 and allows the bridge 22 to close the subsidiary lock switch. This forms a complete circuit, as will be presently explained in connection with the diagrams, and, when the outside handle is turned, energizes solenoid 18 of each subsidiary lock, including the combined subsidiary and master lock on the opposite front door. This attracts the armature 19, shifts link 21, raises retractor bar 2 and, as the outside handle continues to turn, the retractor bar 2 now strikes shoulder 3 and retracts the bolt. As soon as one lets go of the handle, the bolt returns to its projected position and bar 2 is shifted back to the ineffective lower position and switch 22 opens, breaking the current. This principle of operation is not new with the applicants. It is taught in the Carleton Patents 656,011 and 657,853.

Referring to the diagram (Fig. 5): The top and bottom locks on the left hand side of the diagram are the two front door locks which are alternately master and subsidiary locks. The two right hand locks are rear door or subsidiary locks. B is the battery. 29 and 30 are push button switches that are preferably located (29) on the left hand front door and (30) on the right hand front door. 31 and 32 are also push button switches located on the left and right hand front doors. However, these push buttons may be located in any convenient position and, in fact, similar push buttons with the proper electrical connecting can be located adjacent the rear seat in the rear passenger compartment.

Such switches would be wired to one of the master locks on the front door. Now, suppose one wants to lock all the locks from the left hand front door, he closes momentarily switch 31 and this will energize solenoid 8. The circuit is thence to ground and back to the battery. This will break the circuit at 15. This controls the circuit for the subsidiary locks. Or, let us assume that switch 29 is closed, then, solenoid 36 is energized, switch 15 closed and, according to the Carleton principle, the upper right hand subsidiary lock can be operated by operating the outside handle which will allow switch 22 in branch circuit 33 to close. This will establish a circuit through solenoid 34 to ground. The same will also occur through branch control circuit 35, if the rollback in the lower right hand lock in the diagram is rotated and magnet 34 is energized. Or, it will occur if switch 22 in the upper front door lock is allowed to close by turning the outside retractor. This completes the circuit to ground through solenoid 36, via control circuit 37. So, whenever either switch 29 or switch 30 is closed, one of the controlling locking solenoids 36 on the two front doors is energized to close the controlling switch 15 in either door and thereby prepare all the controlling circuits so that any of the other doors can now be opened.

Now, if either of the switches 31 or 32 is closed, it will be seen that either of the solenoids 8 in the two front doors is energized to pull down the armature and open the switch 15. Now, none of the subsidiary locks can be retracted because, on the Carleton principle, a circuit cannot be established through the solenoid of that particular lock when the outside handle is turned.

With two buttons on each front door, it is possible to lock or unlock all the doors by simply pressing the electric buttons on either front door. Buttons 30 and 32 will be associated with the right hand front door (upper, in Fig. 5) and the buttons 29 and 31 will be associated with the left hand front door of Fig 5. Preferably, these buttons will be located on the doors themselves just below the garnish molding. But, obviously, they might be on the adjacent body pillar or on the end of the instrument board.

One can sit in the front seat and lock and unlock all the doors by simply pressing the right buttons on either side of the car. He may want to lock all the doors when he gets in the car against the so-called "red light bandit"—the fellow who jumps on the running board to rob the occupant of the car, when he stops for the red light. Or, if the occupant is locked in, he may want to release the lock so that somebody on the outside can turn the handle to open one of the doors. All the occupant has to do is to press either button 29 or 30.

When the car is unlocked or locked and the occupant of the front seat gets out of the car, he can get out of either front door. When he does this while the car is locked, all the front doors are automatically unlocked again by reason of the bolt camming the retractor bar 2 by means of the cam 7 back to its effective position and this, as already pointed out, throws switch 15 into closed position and prepares all the subsidiary locks for actuation just as soon as someone turns the outside handle and closes the switch in the branch control circuit that controls that particular lock.

After the rider gets out, he can do electrically

what is already taught by the Andersen and Bowlus patent to be done mechanically. With the door open, he presses the locking button 31 or 32. This immediately energizes the solenoid 8 of that particular lock which is now a master lock and that pulls down the retractor bar 2 of that particular lock. This, at the same time, opens the switch 15 of the control circuit of that particular lock and that makes all the branch control circuits (35, 33 and 37) leading to the other three locks dead so that there is no current available to any one of the subsidiary locks to energize the solenoids 34 or 36 when the switch operated by the outside handle of that particular lock is closed. Current also flows through branch circuit 39 to the other front door lock solenoid 8 and opens the other main control circuit 40 from the battery which might furnish energy for the branch control circuits (37, 33, 35 and 41). All the doors are now locked. Now, it is necessary to see that the locks are not all unlocked again by the lock restoring operation of Oschner when the open door is closed. The prevention of the restoration is effected by the Andersen and Bowlus operation of simply turning the door handle down when the door is shut and this withdraws the retractor bar from the range of the ramming part of the bolt.

To unlock the door from the outside, one can turn either of the key operated cams 13 by turning the key in either door. This will pull down the armature and push up the link 10 which closes switch 15. It also physically pushes up the retractor bar of that particular lock so that one is sure of getting in whether the current fails or not. This unlocks that door and all the other doors are unlocked by the ensuing closing of switch 15 because the branch control circuits to those particular locks are prepared and only need to be closed at that particular lock by rotating the handle to open the door.

It will be seen that there is not only a plurality of branch control circuits but there are two main circuits, each connected with all the branches and, of these main circuits, one goes through each front door lock to the source of power, here the battery, so that, with this wiring, each front lock is both a master and a subsidiary lock. This enables one to leave from either front door and enter with a key from either front door.

From a study of the wiring diagram, it will be found that each inside unlocking button switch controls a master lock solenoid circuit from the battery and this solenoid controls a switch which, in turn, controls a main feed circuit from the battery and three branch circuits to all the other locks. These branch circuits, when the main circuit is closed, make available energy to any one of the other locks when the local switch on that lock is closed. Each of the locking buttons of the two front doors controls not only a master locking solenoid on the particular lock adjacent to that button but also on the opposite front door lock through the cross wire 39. This cross wire 39 makes it possible to operate both the master locking solenoids 8 simultaneously with either of switches 31 or 32. Hence, both the main control circuits are simultaneously disrupted and the doors are locked.

Either key operated cam 13 can do the work of the unlocking buttons 29 or 30 by mechanically pulling down one or the other of the armatures 9 in the front doors, either of which

will make available energy for all the other three locks. It is, however, not possible to lock the doors from the outside with the key because, when one switch 15 is opened, there is no provision for opening the other switch 15 and this may be in closed position and so prepare the branch circuits for opening any one of the other doors.

We claim:

1. In an electrical coincidental locking system for automobiles or other vehicles, the combination of a pair of door locks each provided with means to make the outside handle ineffective to retract the bolt, said locks having electrical circuits including each a master switch and a local switch, thereby making each lock both a master lock and a subsidiary lock, additional subsidiary door locks provided each with an electrical circuit, a local switch therein and a solenoid in said circuit and with shiftable means to make the outside handle ineffective to retract the bolt, said shiftable means of all the additional locks being always in ineffective position except when the outside handle of such lock is turned to retract the bolt thereby closing the local switch, but then only when one of the master lock master switches is closed to furnish current to the subsidiary lock electrical circuits, each master door lock provided with two solenoids, mechanical means controlled by said solenoids for shifting the means to make the outside handle ineffective and for shifting the master switch on each master lock, said circuits including unlocking circuits and one solenoid of each master door lock and connecting with a source of current and including one or more control switches which, when one control switch is closed, will close one of the master switches and shift the means on one of the master locks to make the outside handle ineffective to a position which will permit the operation of the bolt from the outside of the door and will condition the local switches of the other locks for closing the circuits and the shiftable means for shifting to a position which will make the outside handles effective upon actuation, said circuits also including a locking set of circuits including the other solenoid of each master door lock and connecting with a source of current and including one or more switches which, when one is closed, will open the master switch of both master door locks and shift the means to make the outside handle ineffective to a position where neither front door lock bolt can be retracted by the outside handle.
2. In an electrical coincidental locking system for automobiles or other vehicles, the combination of a pair of door locks each provided with means to make the outside handle ineffective to retract the bolt, said locks having electrical circuits including each a master switch and a local switch, thereby making each lock both a master lock and a subsidiary lock, each door lock provided with two solenoids, mechanical means controlled by said solenoids for shifting the means to make the outside handle ineffective and to shift the master switch on each lock, said circuits including unlocking circuits and one solenoid of each lock and connecting with a source of current and including one or more control switches which, when one control switch is closed, will close one of the master switches and shift the means on that master lock to make the outside handle ineffective to a position which will permit the operation of the bolt from the outside of the door, and said circuits including a second or unlocking

set of circuits including the other solenoid of each lock and connecting with a source of current and including one or more switches which, when one is closed, will open the master switch of each lock and shift the means to make the outside handle ineffective to a position where neither lock bolt can be retracted by the outside handle.

3. In an electrical coincidental locking system for automobiles or other vehicles, the combination of a pair of door locks each provided with means to make the outside handle ineffective to retract the bolt, said locks having electrical circuits including each a master switch and a local switch, thereby making each lock both a master lock and a subsidiary lock, each door lock provided with two solenoids, mechanical means controlled by said solenoids for shifting the means to make the outside handle ineffective and to shift the master switch on each lock, key operated means in each door for physically shifting said mechanical means to unlock the door from the outside, said circuits including unlocking circuits and one solenoid of each lock and connecting with a source of current and including one or more control switches which, when one control switch is closed, will close one of the master switches and shift the means on one of the locks to make the outside handle ineffective to a position which will permit the operation of the bolt by the outside handle and will condition the local switch of the other lock for closing the circuit and the shiftable means for shifting to a position which will make the outside handle effective upon actuation, said circuits including a second set of circuits including the other solenoid of each lock and connecting with a source of current and including one or more switches which, when one is closed, will open the master switch of each lock and shift the means to make the outside handle ineffective to a position where neither lock bolt can be retracted by the outside handle.

4. In an electrical coincidental locking system for automobiles or other vehicles, the combination of a pair of door locks each provided with means to make the outside handle ineffective to retract the bolt, said locks having electrical circuits including each a master switch and a local switch, thereby making each lock both a master lock and a subsidiary lock, each door lock provided with two solenoids, mechanical means controlled by said solenoids for shifting the means to make the outside handle ineffective and to shift the master switch on each lock, key operated means in each door for physically shifting said mechanical means to unlock the door and to make all the locks operable from the outside by reason of closing one master switch, said circuits including unlocking circuits and one solenoid of each lock and connecting with a source of current and including one or more control switches which, when one control switch is closed, will close one master switch and shift the means on one master lock to make the outside handle ineffective to a position which will permit the operation of the bolt by the outside handle and will condition the local switch of the other lock for closing the circuit and the shiftable means for shifting to a position which will make the outside handle effective upon actuation, said circuits including a second set of circuits including the other solenoid of each lock and connecting with a source of current and in-

cluding one or more switches which, when one is closed, will open the master switch of each lock and shift the means to make the outside handle ineffective to a position where neither lock bolt can be retracted by the outside handle.

5. In an electrical coincidental locking system for automobiles or other vehicles, the combination of a pair of door locks each provided with means to make the outside handle ineffective to retract the bolt, said locks having electrical circuits including each a master switch and a local switch, thereby making each lock both a master lock and a subsidiary lock, each door lock provided with two solenoids, linkage controlled by said solenoids for shifting the means to make the outside handle ineffective and to shift the master switch on each lock, said circuits including unlocking circuits and one solenoid of each lock and connecting with a source of current and including one or more control switches which, when one control switch is closed, will close one master switch and shift the means on one of said lock to make the outside handle ineffective to a position which will permit the operation of the bolt by the outside handle and will condition the local switch of the other lock for closing the circuit and the shiftable means for shifting to a position which will make the outside handle effective upon actuation, said circuits including a second or locking set of circuits including the other solenoid of each lock and connecting with a source of current and including one or more switches which, when one is closed, will open the master switch of each lock and shift the means to make the outside handle ineffective to a position where neither lock bolt can be retracted by the outside handle.

6. In an electrical coincidental locking system for automobiles or other vehicles, the combination of a pair of door locks each provided with means to make the outside handle ineffective to retract the bolt, said locks having electrical circuits including each a master switch and a local switch, thereby making each lock both a master lock and a subsidiary lock, each door lock provided with two motors, mechanical means controlled by said motors for shifting the means to make the outside handle ineffective and to shift the master switch on each lock, said circuits including unlocking circuits controlling one motor of each lock and connecting with a source of current and including one or more control switches which, when one control switch is closed, will close one master switch and shift the means on one of the locks to make the outside handle ineffective to a position which will permit the operation of the bolt from the outside of the door and will condition the local switch of the other lock for closing the circuit and the shiftable means for shifting to a position which will make the outside handle effective upon actuation, said circuits including a second or locking set of circuits controlling the other motor of each lock and connecting with a source of current and including one or more switches which, when one is closed, will open the master switch of each lock and shift the means to make the outside handle ineffective to a position where neither lock bolt can be retracted by the outside handle.

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