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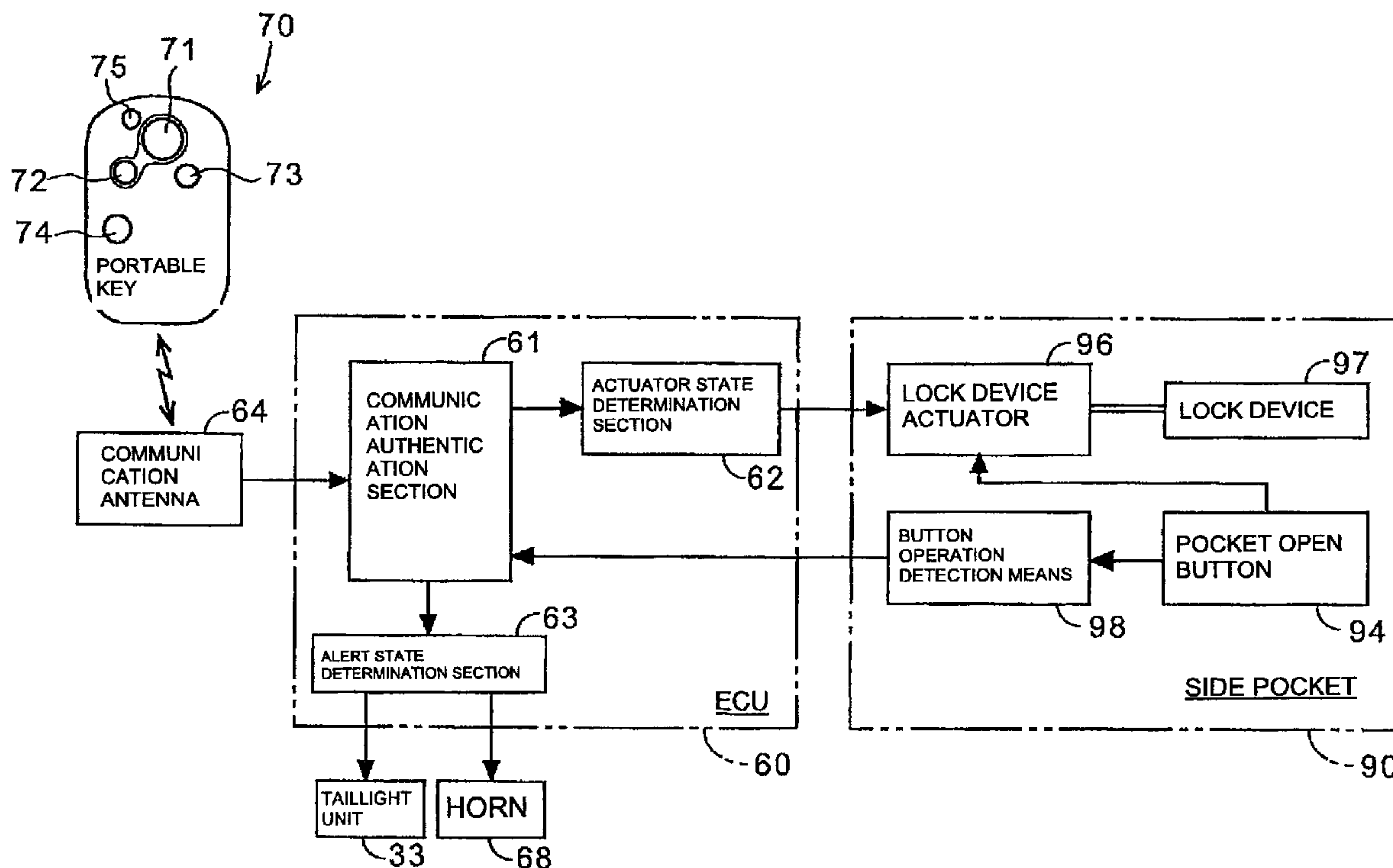
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(54) Titre : DISPOSITIF DE VERROUILLAGE D'UNE BOITE DE RANGEMENT DE VEHICULE

(54) Title: VEHICLE STORAGE BOX LOCKING DEVICE



(57) Abrégé/Abstract:

To provide a vehicle storage box locking device that can prevent a portable key from being locked in by performing authentication of the portable key before a locking operation of the storage box. The locking device includes a lock device for maintaining or canceling a closed state of a side pocket (hereinafter referred to as the pocket); a lock device actuator for driving the lock device; and an open button for opening the pocket. Authentication of the portable key is performed when the open button is operated. If the authentication is normally terminated, the lock device is driven to open a pocket lid. If the authentication is not normally terminated, the pocket is held in the closed state. Authentication of the portable key is performed when the pocket lid is closed with the pocket in an open state. If the authentication is normally terminated, the lock device is driven to place the pocket in the closed state. If the authentication is not normally terminated, the pocket is held in the open state.

ABSTRACT OF THE DISCLOSURE

To provide a vehicle storage box locking device that can prevent a portable key from being locked in by performing authentication of the portable key before a locking operation of the storage box. The locking device includes a lock device for maintaining or canceling a closed state of a side pocket (hereinafter referred to as the pocket); a lock device actuator for driving the lock device; and an open button for opening the pocket. Authentication of the portable key is performed when the open button is operated. If the authentication is normally terminated, the lock device is driven to open a pocket lid. If the authentication is not normally terminated, the pocket is held in the closed state. Authentication of the portable key is performed when the pocket lid is closed with the pocket in an open state. If the authentication is normally terminated, the lock device is driven to place the pocket in the closed state. If the authentication is not normally terminated, the pocket is held in the open state.

VEHICLE STORAGE BOX LOCKING DEVICE

FIELD OF THE INVENTION

5 The present invention relates in general to a locking device for a storage box in a vehicle and, more particularly, to a vehicle storage box locking device that changes from a locked state to an unlocked state, or vice versa, by performing authentication with a portable key uniquely set for the vehicle.

BACKGROUND OF THE INVENTION

10 A known vehicle locking device is arranged such that, when an ID uniquely set for the vehicle is authenticated through radio communication performed between a portable key possessed by a user and a control unit included in the vehicle, the authentication enables, for example, an engine of the vehicle to be started or a trunk or other storage box of the vehicle to be opened. Such a
15 locking device requires a measure that can prevent "inadvertent locking" of the portable key inside the storage box, so that the portable key is no longer accessible.

Japanese Patent Laid-Open No. 2006-77408 discloses a trunk locking system for a
20 four-wheel vehicle, in which a dedicated transmitter that detects a portable key existing inside a trunk is disposed inside the trunk and, if the dedicated transmitter detects that the portable key has been locked in, an unlocking switch disposed on the outside of the trunk is enabled, so that the user can open the trunk even if he or she does not carry the portable key with him or her.

25 Unfortunately, however, the technique disclosed in Japanese Patent Laid-Open No. 2006-77408 has the following problem. Specifically, the technique requires the dedicated transmitter that detects the portable key existing inside the trunk,

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so that the number of parts used increases, resulting in a highly complicated arrangement. It is also difficult to apply the technique to a vehicle, such as a motorcycle, that has little extra space.

- 5 It is an object of the present invention to solve the foregoing problem of the prior-art technique and provide a vehicle storage box locking device that can prevent a portable key from being locked in by performing authentication of the portable key before a locking operation of the storage box.

10 **SUMMARY OF THE INVENTION**

According to an aspect of the present invention, there is provided a locking device for a storage box in a vehicle, changing between a locked state and an unlocked state by performing authentication of a portable key uniquely set for the vehicle. The locking device includes: a lock device for placing the storage
15 box in a closed state or an open state; an actuator for driving the lock device; and an open button for placing the storage box in the open state. The locking device is firstly characterized by being structured such that: authentication of the portable key is performed when the open button is operated and the storage box is closed and, if the authentication is normally terminated when the open button
20 is operated, the lock device is driven to place the storage box in the open state; if the authentication is not normally terminated, the storage box is held in the closed state without the lock device being driven; and if the authentication is normally terminated when the storage box is closed, the lock device is driven to place the storage box in the closed state; if the authentication is not normally
25 terminated, the storage box is held in the open state without the lock device being driven.

The locking device is secondly characterized in that the lock device is driven to place the storage box in the closed state, if the storage box is held in the closed
30 state for a predetermined period of time when the authentication performed when the storage box is closed is not normally terminated.

According to another aspect of the present invention, there is provided a locking device for a storage box in a vehicle, changing between a locked state and an

unlocked state by performing authentication of a portable key uniquely set for the vehicle. The locking device includes: an open/close latch for changing the storage box between a closed state and an open state; an open lever for driving the open/close latch in an open direction; a lock knob capable of being selectively placed in either a locked position, in which the storage box is brought into a locked state by prohibiting the open/close latch from being driven in the open direction, or an unlocked position, in which the storage box is brought into an unlocked state by enabling the open/close latch to be driven in the open direction; and an actuator for allowing the lock knob to be selectively placed in either the locked position or the unlocked position. The locking device is thirdly characterized by being structured such that: the lock knob is disposed outwardly of a vehicle body and structured so as to, while allowing manual placement from the unlocked position to the locked position, be placed in the unlocked position from the locked position only by the actuator; authentication of the portable key is performed when the open lever is operated with the storage box in the locked state and, if the authentication is normally terminated when the open lever is operated, the lock knob is driven into the unlocked position; if the authentication is not normally terminated, the lock knob is held in the locked position; and authentication of the portable key is performed when the lock knob is placed from the unlocked position to the locked position and, if the authentication is normally terminated when the lock knob is operated, the lock knob is held in the locked position; if the authentication is not normally terminated, the actuator places the lock knob in the unlocked position.

According to the first aspect of the present invention, the lock device can be driven only if the authentication of the portable key is normally terminated, regardless of the timing at which the open button is operated or the storage box is closed. This can prevent any third person having no portable keys from opening or closing the storage box. It should be noted here that the portable key is not normally authenticated, if the portable key exists in an area outside a communicable range relative to a vehicle body side, or radio communication is disabled due to a faulty portable key or a rundown battery. Further, the portable key is normally authenticated, if the portable key exists in an area within the communicable range relative to the vehicle body side, which includes a case in

which the portable key exists inside the storage box. Consequently, even if the storage box is closed with the portable key left therein, the storage box, though placed in the locked state if the authentication is normally terminated, can be opened by operating the open button. This prevents the portable key from being locked in. A measure can therefore be taken for preventing the portable key from being locked in without using any dedicated sensor for detecting whether or not the portable key exists inside the storage box. Specifically, a locking system having a function of preventing the portable key from being locked in can be realized at low cost.

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According to the second aspect of the present invention, the lock device is driven to place the storage box in the closed state, if the storage box is held in the closed state for a predetermined period of time when the authentication performed when the storage box is closed is not normally terminated. Specifically, the storage box can be placed in the closed state at the will of the occupant, even if the authentication of the portable key is not normally terminated.

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According to the third aspect of the present invention, the locked state can be switched to the unlocked state only when the authentication of the portable key is normally terminated, regardless of whether the open lever is operated or the lock knob is placed into the locked position. This prevents any third person having no portable keys from opening or closing the storage box. In addition, as long as an operator carries the portable key with him or her, he or she can open the storage box by only operating the open lever with the storage box in the locked state. Further, the storage box is placed in the locked state as long as the authentication is normally terminated, even when the storage box is closed with the portable key left therein; but the storage box can still be opened by operating the open lever. This prevents the portable key from being locked in.

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30 **BRIEF DESCRIPTION OF THE DRAWINGS**

Preferred embodiments of the invention are shown in the drawings, wherein:

Fig. 1 is a perspective view showing a motorcycle to which a storage box locking device according to an embodiment of the present invention is applied.

Fig. 2 is an enlarged view showing a side pocket according to a first embodiment of the present invention.

- 5 Fig. 3 is a block diagram showing an arrangement of a lock device and parts associated therewith of the side pocket according to the first embodiment of the present invention.

- 10 Fig. 4 is a flowchart showing a flow of control operations performed when the side pocket is to be closed.

Fig. 5 is a partly enlarged view showing a condition, in which a trunk according to a second embodiment of the present invention is in a closed state.

- 15 Fig. 6 is a partly enlarged view showing a condition, in which the trunk according to the second embodiment of the present invention is in an open state.

Fig. 7 is an enlarged perspective view showing an open lever and a lock knob.

- 20 Fig. 8 is an illustration of the lock knob and a lock knob actuator that drives the lock knob, illustrating how the lock knob actuator actuates the lock knob.

Fig. 9 is a block diagram showing an arrangement of a locking device of the trunk and parts associated therewith.

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Fig. 10 is a flowchart showing a flow of control operations performed when the trunk is locked through manual operation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

- 30 Preferred embodiments to which the present invention is applied will be described below with reference to the accompanying drawings. Fig. 1 is a perspective view showing a motorcycle 1 to which a storage box locking device according to an embodiment of the present invention is applied, as viewed from a left rearward direction. The motorcycle 1 includes a steering stem not shown

that is rotatably journaled forwardly of a vehicle body frame 2. A steering handlebar 5 and a pair of left and right front forks 4 are fixed on upper and lower portions, respectively, of the steering stem. A front wheel WF is rotatably journaled on lower ends of the front forks 4. An engine 3 as a drive source is
5 suspended downwardly of the vehicle body frame 2. A side cowl 6 covers an area upward of the engine 3. A left-right two-lamp headlight 8 is disposed forwardly of the side cowl 6. A meter unit 10 is disposed at a central portion of the vehicle body forward of the steering handlebar 5. A windscreen 9 is attached upwardly of the meter unit 10. A side pocket 90 as a storage box according to a
10 first embodiment of the present invention is disposed upwardly of the side cowl 6 on the left side in a vehicle width direction.

An openable lid 11 of a filler port is disposed at the center in the vehicle width direction rearward of the steering handlebar 5. A seat 12 is disposed rearwardly
15 of the openable lid 11. A swing arm (not shown) that rotatably journals a rear wheel WR is vertically swingably journaled on a pivot 13 at a rear end portion of the vehicle body frame 2. A pair of left and right mufflers 14 is mounted on outboard sides in the vehicle width direction of the swing arm. A pair of left and right saddle bags 15 is mounted on upper portions of the mufflers 14. A trunk 30
20 as a storage box according to a second embodiment of the present invention is mounted upwardly of the saddle bags 15 at the center in the vehicle width direction. The trunk 30 includes an openable trunk lid 31 disposed in an opening of a case 32. A pair of left and right taillight units 33 is disposed at a rear end portion of the case 32. A backrest 16 of a rear seat is disposed at a forward upper
25 portion of the case 32.

Fig. 2 is an enlarged view showing the side pocket 90. The side pocket 90 includes a storage portion 91 and a pocket lid 92 that is mounted on an opening of the storage portion 91 via a hinge (not shown). The pocket lid 92 is urged in
30 an open direction at all times by an urge means not shown. The side pocket 90 is adapted to maintain a closed state such that a lock device not shown disposed inside an engagement hole 99 grips a hook 93 provided in a standing condition on a backside of the pocket lid 92. An open button 94 for driving the lock device

to release the hook 93, specifically, for opening the pocket lid 92 is disposed rearwardly of the side pocket 90.

Through the foregoing arrangements, the side pocket 90 works as follows. Specifically, when the open button 94 is operated under a predetermined condition, the pocket lid 92 automatically opens to an open position as shown in Fig. 2; when the pocket lid 92 is closed under a predetermined condition, the lock device is activated to maintain the closed state. A power outlet 95 for accessories is disposed inside the storage portion 91.

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Fig. 3 is a block diagram showing an arrangement of the lock device and parts associated therewith of the side pocket 90 according to the first embodiment of the present invention. Like parts are identified by the same reference numerals as those used in Figs. 1 to 2. The side pocket 90 includes a pocket open button (hereinafter referred at times to as the open button) 94 for driving a lock device 97. The side pocket 90 also includes a lock device actuator 96 and button operation detection means 98. Specifically, the lock device actuator 96 drives the lock device 97. The button operation detection means 98 detects that the open button 94 is operated. Note that the lock device 97 may include a pin to be engaged with the hook 93 and a solenoid, a motor, or other part that protrudes or retracts the pin.

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A portable key 70 carried by an occupant includes a power button 74 of the portable key 70 and a light-emitting diode 75 for operation check, in addition to a lock button 71, an unlock button 72, and a pop-up (automatically open) button 73 as used for operation of the above-referenced trunk 30. Typically, the portable key 70 is set to offer a communicable range of a radius of less than two meters from the vehicle.

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An ECU 60 includes an actuator drive control section 62, a communication authentication section 61, and an alert state determination section 63. Specifically, the actuator drive control section 62 applies a driving signal to the lock device actuator 96. The communication authentication section 61 performs authentication as to whether the portable key 70 is a valid portable key of the

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motorcycle 1 based on a radio wave received via a communication antenna 64. The alert state determination section 63 determines whether the occupant needs to be alerted based on the result of authentication performed by the communication authentication section 61, the condition of the lock device 97, and
5 the like.

The communication authentication section 61 performs authentication of the portable key 70 through, for example, collation of an encryption code contained in the received radio wave. The alert state determination section 63, if
10 determining that an alert is necessary, operates alert means including the taillight units 33 and a horn 68. Various other modified forms are possible for the alert means, including the headlight, a flasher unit, a display of a navigation system, and a speaker of an audio system.

15 Fig. 4 is a flowchart showing a flow of control operations performed when the side pocket 90 (hereinafter referred at times to as the pocket 90) is to be locked. In step S10, it is determined whether the pocket lid 92 of the pocket 90 is closed or not. An open or closed position of the pocket lid 92 is detected by, for example, a switch sensor that detects that the pocket lid 92 leaves a closed
20 position thereof. Step S11 is reached when step S10 is determined in the affirmative. In step S11, authentication of the portable key 70 is started. In step S12, it is determined whether the authentication is normally terminated or not. Step S13 is reached when step S12 is determined in the affirmative. In step S13, the lock device actuator 96 is driven to place the pocket lid 92 in a locked state
25 and the series of control operations is terminated.

Step S14 is reached when step S12 is determined in the negative. In step S14, it is determined if a predetermined period of time (e.g. 15 seconds) has elapsed with the side pocket 90 closed. If step S14 is determined in the negative, the pocket 90
30 is held in the open state without the lock device 97 being driven and the series of control operations is terminated. If step S14 is determined in the affirmative, step S16 is reached and an alert is issued using the alert means. In step S17, the pocket 90 is placed in the locked state and the series of control operations is terminated. It should be noted here that the portable key 70 is not normally

authenticated, if the portable key 70 exists in an area outside a communicable range relative to a vehicle body side, or radio communication is disabled due to a faulty portable key 70 or a rundown battery. Further, the portable key 70 is normally authenticated, if the portable key 70 exists in an area within the
5 communicable range relative to the vehicle body side, which includes a case in which the portable key 70 exists inside the pocket 90.

Note that, when the pocket 90 in the locked state is to be opened, authentication of the portable key 70 is performed as the open button 94 is operated. If the
10 authentication is normally terminated, the lock device actuator 96 is driven to open the pocket lid 92. If the authentication is not normally terminated, on the other hand, the lock device actuator 96 is not driven and the pocket lid 92 is held in the closed position.

15 According to the locking and unlocking control of the side pocket 90 as described above, the side pocket 90 can be prevented from being opened or closed by any third person who does not carry the portable key 70 with him or her. In addition, should the side pocket 90 be closed with the portable key 70 left therein, the authentication of the portable key 70 is again normally performed as
20 the open button 94 is operated, so that the side pocket 90 can be opened, since it is confirmed during closing that radio communication is possible with the portable key 70. This prevents the portable key 70 from being locked in.

Additionally, if a predetermined period of time elapses with the pocket lid 92
25 closed, the side pocket 90 is locked even if the authentication with the portable key 70 is not normally terminated. Should the portable key 70 be faulty, therefore, the side pocket 90 can be closed at the will of the occupant.

Figs. 5 and 6 are enlarged views showing the trunk 30 as a storage box according
30 to the second embodiment of the present invention. Fig. 5 shows a condition, in which the trunk 30 is in a closed state and Fig. 6 shows a condition, in which the trunk 30 is in an open state. Like parts are identified by the same reference numerals as those used in Fig. 1. The trunk 30 according to the second embodiment of the present invention includes a hinge (not shown) disposed at a

front end portion of the case 32, with which to openably journal the trunk lid 31. Referring also to Fig. 7 of an enlarged view, the trunk lid 31 includes an open lever 40 and a button-type lock knob 50, both disposed outwardly of the vehicle body. The open lever 40 drives an open/close latch 41. The lock knob 50 pops
5 up or down depending on a locked state or an unlocked state of the trunk 30.

When the open lever 40 is operated with the trunk 30 in a closed and unlocked state, the open/close latch 41 is driven to be disengaged from a hook (not shown) on a side of the case 32, so that the trunk lid 31 is opened. When the trunk 30 is
10 in the locked state, on the other hand, the open/close latch 41 is not driven even by operating the open lever 40, so that the trunk lid 31 is not to be opened. Alternatively, when the trunk lid 31 is to be closed, there is no need to use the open lever 40; instead, simply pressing an upper portion of the trunk lid 31 downwardly will make the hook and the open/close latch 41 engaged with each
15 other to thereby maintain the closed state.

The lock knob 50 of a cylindrical shape is in an unlocked position (indicated by a solid line in Fig. 7), in which the lock knob 50 protrudes largely from a mounting surface when the trunk 30 is in the unlocked state. When the trunk 30 is in the
20 locked state, on the other hand, the lock knob 50 is retracted in the mounting surface with a protrusion amount thereof significantly reduced into a locked position (indicated by a dash-double-dot line in Fig. 7). This allows the occupant of the motorcycle 1 to determine whether the trunk 30 is in the locked or unlocked state by simply viewing the lock knob 50.

25 The lock knob 50 is adapted to be placed in the locked position such that a round bottom operating face of the lock knob 50 is retracted to be flush with, or lower than, the mounting surface. This allows the lock knob 50, when in the unlocked position, to be depressed down into the locked position; while the lock knob 50,
30 when in the locked position, cannot be held by hand, so that there is no likelihood that the lock knob 50 will be operated manually to be placed from the locked to unlocked position.

The shapes and positions of the open lever and the lock knob are not limited to those of the second embodiment of the present invention and other shapes and positions are possible. For example, the open lever and the lock knob may be disposed on the side of the case, and the open/close latch may also be disposed on the side of the case. The open lever and the lock knob may still be disposed on a lower surface or a side surface of the case, or may be disposed at separate places spaced apart from each other.

Fig. 8 is an illustration of the lock knob 50 and a lock knob actuator 66 that drives the lock knob 50, illustrating how the lock knob actuator 66 actuates the lock knob 50. A rocking arm 82 is mounted on a rocking shaft 80 of the lock knob actuator 66 that may include, for example, a solenoid or a motor. A driving rod 83 is connected to the rocking arm 82. The lock knob 50 is mounted on a leading end of the driving rod 83. According to the foregoing arrangements, driving the lock knob actuator 66 will allow the lock knob 50 to be selectively placed in either the locked position or the unlocked position.

When the lock knob 50 is in the unlocked position, in which the lock knob 50 protrudes from a mounting surface 84, the lock knob 50 may be depressed from the outside. This will allow the lock knob 50 to be depressed in the mounting surface 84 into the locked position (indicated by a dash-double-dot line in Fig. 8), while rotating the rocking shaft 80 in a counterclockwise direction shown in Fig. 8. Note that an output signal from a position sensor 81 that detects that the lock knob 50 is in either the locked position or the unlocked position is transmitted to the communication authentication section 61 of the ECU 60.

Fig. 9 is a block diagram showing an arrangement of a locking device of the trunk 30 and parts associated therewith. Like parts are identified by the same reference numerals as those used in the foregoing figures. Descriptions of the same arrangements as those of Fig. 3 will not be reiterated. As described earlier, the trunk 30 includes the open lever 40 for driving the open/close latch 41 and the lock knob 50 that prohibits driving of the open/close latch 41 in the locked state. The trunk 30 also includes the lock knob actuator 66, an open/close latch actuator 42, and lever operation detection means 67. Specifically, the lock knob

actuator 66 drives the lock knob 50. The open/close latch actuator 42 drives the open/close latch 41. The lever operation detection means 67 detects that the open lever 40 is operated. The lever operation detection means 67 may be structured to include, for example, an ON-OFF type switch sensor that detects
5 that the lever has moved out of an initial position.

The trunk 30 is adapted to be operable to be locked, unlocked, or automatically opened by the portable key 70 which the occupant carries with him or her. The ECU 60 according to the embodiment includes the actuator drive control section
10 62, the communication authentication section 61, and the alert state determination section 63. Specifically, the actuator drive control section 62 applies a driving signal to each of the lock knob actuator 66 and the open/close latch actuator 42. The communication authentication section 61 performs authentication as to whether the portable key 70 is a valid portable key of the
15 motorcycle 1 based on a radio wave received via a communication antenna 64. The alert state determination section 63 determines whether the occupant needs to be alerted based on the result of authentication performed by the communication authentication section 61, the condition of the lock knob 50, and the like.

20 Fig. 10 is a flowchart showing a flow of control operations performed when the trunk 30 is locked through manual operation. In step S30, it is determined whether the trunk 30 is closed or not. Step S31 is reached when step S30 is determined in the affirmative. Whether the trunk lid 31 is in the closed state or
25 the open state can be detected by, for example, an ON-OFF type sensor that detects that the trunk lid 31 moves out of the closed position. In step S31, it is determined whether the lock knob 50 is placed in the locked position or not. Step S32 is reached when step S31 is determined in the affirmative and authentication of the portable key 70 is started. Note that the operation returns
30 to steps S30 and 31 if steps S30 and S31 are determined in the negative, respectively.

In step S33 that follows, it is determined whether the authentication is normally terminated. Step S34 is reached and the lock knob 50 is held in the locked

position when step S33 is determined in the affirmative. This completes the series of control operations. Note that, if step S33 is determined in the negative, specifically, if it is determined that an operator who does not carry the portable key 70 with him or her presses the lock knob 50, the operation proceeds to step 5 S35. In step S35, the lock knob actuator 66 returns the lock knob 50 to the unlocked position and, in step S36, an alert is issued using the alert means.

Note that, when the trunk 30 in the locked state is to be opened manually, authentication of the portable key 70 is performed as the open lever 40 is 10 operated. If the authentication is normally terminated, the lock knob actuator 66 is driven to place the lock knob 50 in the unlocked position, so that the trunk lid 31 is opened. If the authentication is not normally terminated, on the other hand, the lock knob actuator 66 is not driven, so that the trunk 30 is held in the closed state.

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According to the locking and unlocking control of the trunk 30 as described above, the trunk 30 can be prevented from being opened or closed by any third person who does not carry the portable key 70 with him or her. In addition, should the trunk 30 be closed with the portable key 70 left therein and should the 20 lock knob 50 then be further depressed, the trunk 30 can still be opened by operating the open lever 40. This prevents the portable key 70 from being locked in the trunk 30.

As described heretofore, in the storage box locking device according to the 25 embodiments of the present invention, when the storage box such as, for example, the side pocket or the trunk, is closed, radio communication is carried out with the portable key and the storage box is to be placed in the locked state after the authentication of the portable key is normally terminated. Accordingly, the storage box can be opened again by operating the open lever, the open 30 button or the like, even if the portable key is locked in the side pocket or the trunk. This prevents the portable key from being locked in the side pocket, the trunk, or other storage box.

The structures of the side pocket and the trunk, structures and positions of open button of the side pocket, and the lock knob and the open lever of the trunk, and structures and configuration of actuators, sensors, and other parts, are not limited to those described in the embodiments of the present invention; rather, various modifications are possible. For example, the storage box locking device according to the embodiments of the present invention may be applicable, for example, to a side pocket having a lock knob or a trunk having no lock knobs. Further, the storage box locking device according to the embodiments of the present invention may be applied, for example, to a three-wheeled vehicle or a four-wheeled vehicle, in addition to the motorcycle.

Although various preferred embodiments of the present invention have been described herein in detail, it will be appreciated by those skilled in the art, that variations may be made thereto without departing from the spirit of the invention or the scope of the appended claims.

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

1. A locking device in combination with a vehicle storage box having a
5 compartment and a lid; said lid being movable between an open position
allowing access to said compartment and a closed position preventing access to
the compartment, said locking device comprising;
a lock mechanism movable between a locked position where said lock
mechanism cooperates with said storage box in said closed position to lock the
10 lid in said closed position and an unlocked position where said lid is free to
move between said open position and said closed position;
a drive controlled by a signal process to move the lock mechanism between said
locked position and said unlocked position;
a sensor to determine if the lid is in said open position or said closed position;
15 an authenticator operable to communicate with and authenticate the presence of
a predetermined portable key
an user input device
said signal processor configured to communicate with said sensor, said
authenticator and said user input device;
20 wherein when said lid is in said closed position, said lock mechanism is in said
locked position and said user input device is activated, said signal processor
communicates with said authenticator which initiates authentication to
determine whether said predetermined portable key is present, and said lock
mechanism is driven to said unlocked position and if said predetermined
25 portable key is not present, said lock mechanism remains in said locked position;
and when said lock mechanism is in said unlocked position and said sensing
arrangement senses the change in the lid position and said sensing arrangement
senses the change in the lid position from said open position to said closed
position, said signal processor communicates with said authenticator which
30 initiates authentication to determine if said predetermined portable key is
present;
and wherein said drive moves said lock mechanism to said locked mechanism to
said locked position if said predetermined portable key is present and if said
predetermined portable key is not present, said lock mechanism remains in said
35 unlocked position.

2. A locking device as claimed in claim 1 wherein when said sensor senses said storage box has changed from an open state to a closed state, said signal processor initiates said authenticator; if said predetermined portable key is not present and said storage box is maintained in the closed position for a predetermined period of time, upon the expiry of said predetermined period of time, said signal process activates said drive and moves said lock mechanism to said locked position.
3. The locking device of claim 1 wherein the storage box is part of a motorcycle vehicle or an off road saddle ride type vehicle.
4. A locking device for a storage box in a vehicle, comprising: securing means for placing the storage box in a locked state or an open state; actuating means for driving the lock device; and releasing means for placing the storage box in the open state, wherein the locking device includes an authenticator to authenticate the presence of a portable key when the releasing means is operated and the storage box is closed; wherein, when the portable key is authenticated when the releasing means is operated, the securing means places the storage box in the open state, and wherein, when the portable key is not authenticated when the releasing means is operated, the storage box is configured to be held in the locked state without the securing means being driven, wherein, when the portable key is authenticated when the storage box is closed, the securing means is for placing the storage box in the closed state, and wherein, when the portable key is not authenticated when the storage box is closed, the securing means maintains the storage box in the open state without the securing means being driven.
5. A method for changing a locking device of a storage box from a locked state to an unlocked state by performing authentication of a portable key uniquely set for a vehicle, authentication determining whether the portable key is present, the method comprising: determining whether the storage box is in a closed state or an open state; performing the authentication of the portable key to determine if the portable key is present, using a locking device, when a button is operated and the storage box is closed; placing the storage box in the open state, when the portable key is authenticated when the button is operated; holding the storage box in the closed state without the locking device being driven, when the portable key is not authenticated when the button is operated; placing the

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storage box in the closed state, when the portable key is authenticated when the storage box is closed; and holding the storage box in the open state without the locking device being driven, when the portable key is not authenticated when the storage box is closed.

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6. The method of claim 5, further comprising: maintaining the storage box in the closed state, when the storage box is held in the closed state for a predetermined period of time and when the portable key is not authenticated.

10 7. The method of claim 5, further comprising: terminating the authentication of the portable key when a determination has been made that the portable key is a valid portable key for the vehicle.

8. A method for changing a storage box in a vehicle between a locked state and an unlocked state by performing authentication of a portable key uniquely set for the vehicle to determine whether said portable key is present, the method comprising: determining whether the storage box is in a closed state or an open state; performing the authentication of the portable key, using a locking device, when an open lever is operate when the storage box is in the locked state, the performing comprising driving the lock knob of the locking device to place the storage box in the unlocked state, when the portable key is authenticated when the open lever is operated, and holding the lock knob of the locking device to place the storage box in the locked state, when the portable key is not authenticated; and performing an authentication of the portable key, using the locking device, when the lock knob of the locking device is changed from the unlocked position to the locked position, the performing comprising holding the lock knob of the locking device to place the storage box in the locked state, when the portable key is authenticate when the lock knob is operated, and actuating the locked knob to place the storage box in the unlocked state, when the portable key is not authenticated.

9. The method of claim 8, further comprising: terminating the authentication of the portable key when a determination has been made that the portable key is a valid portable key for the vehicle.

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FIG. 1

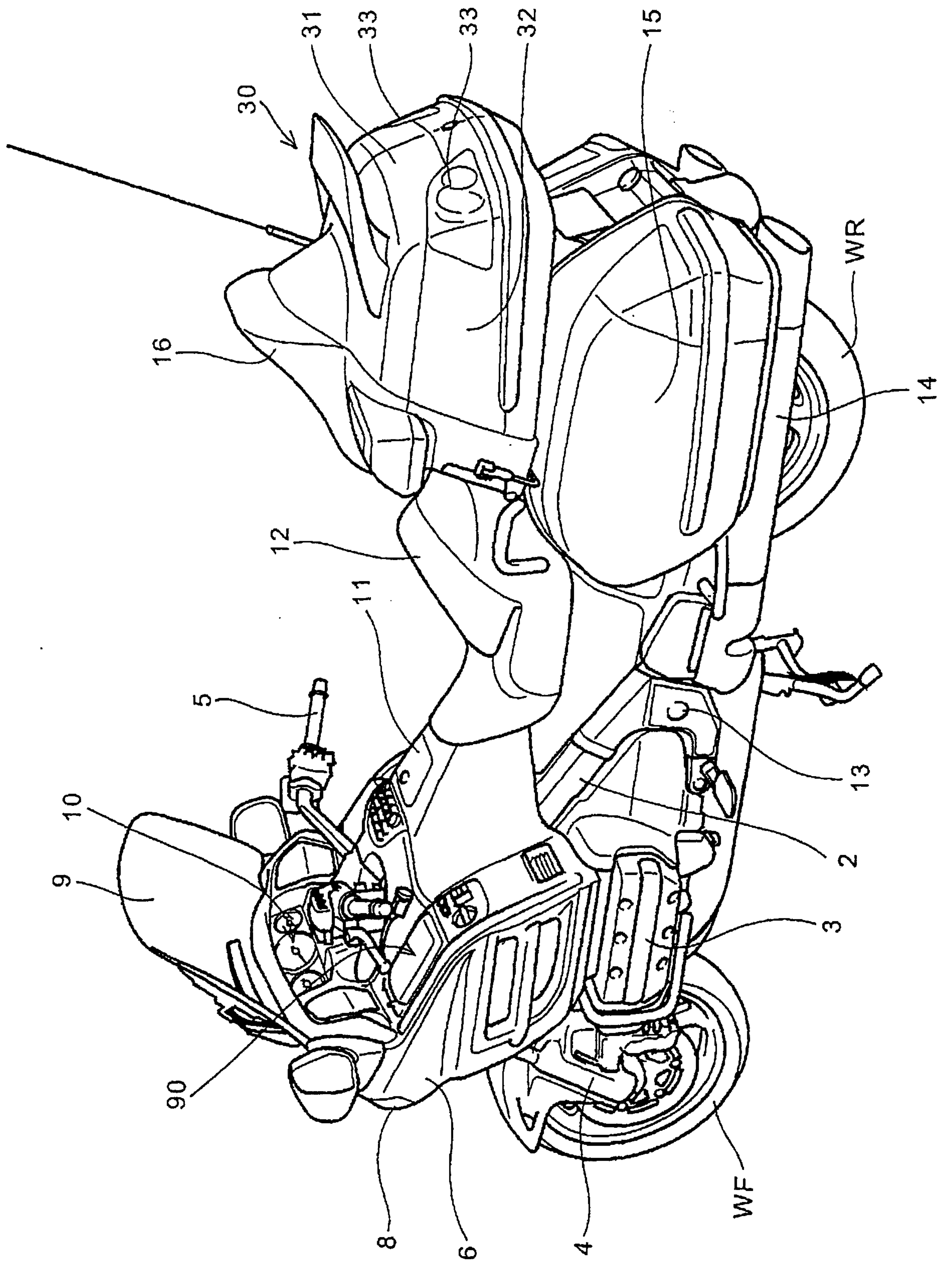


FIG. 2

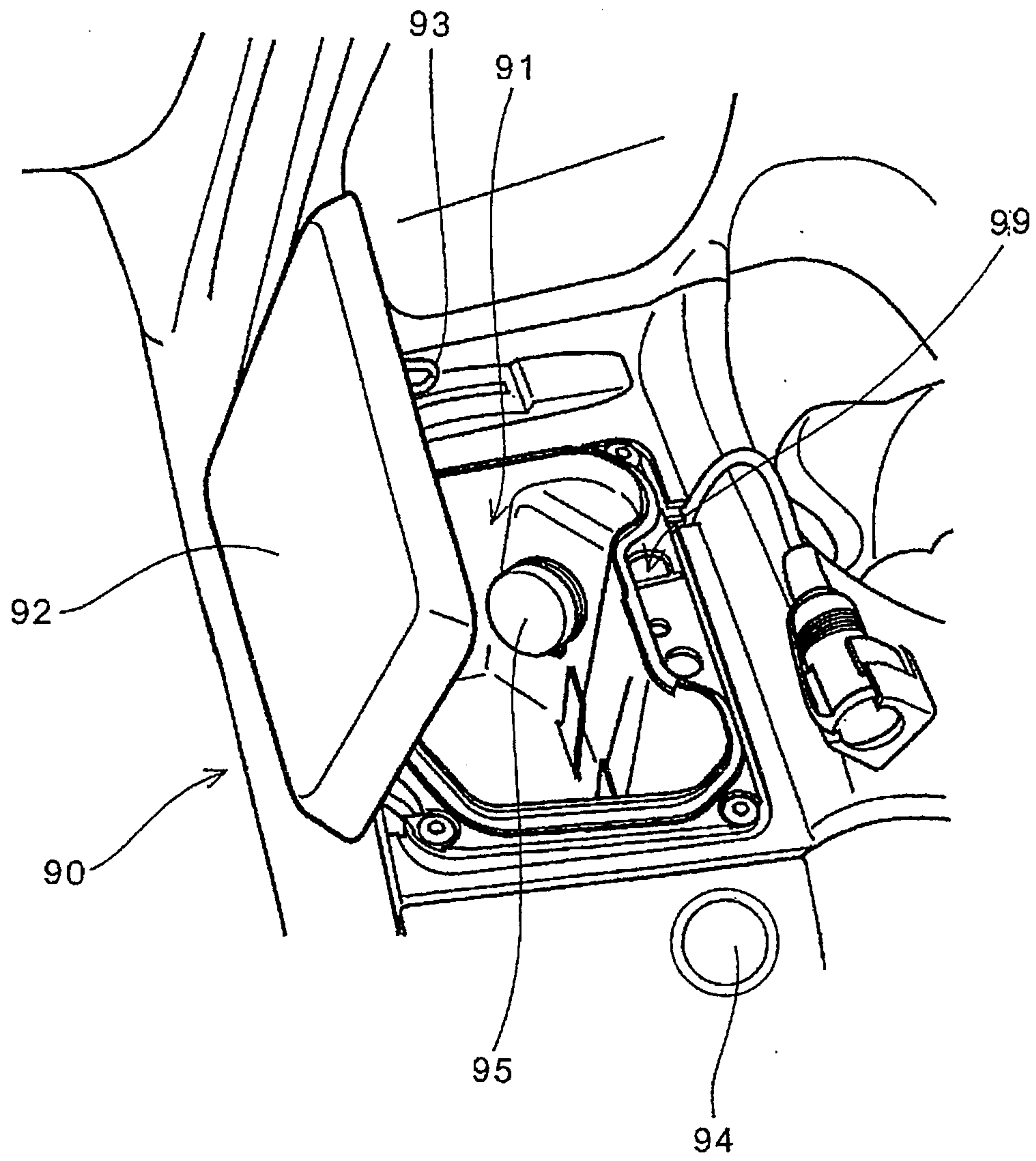


FIG. 3

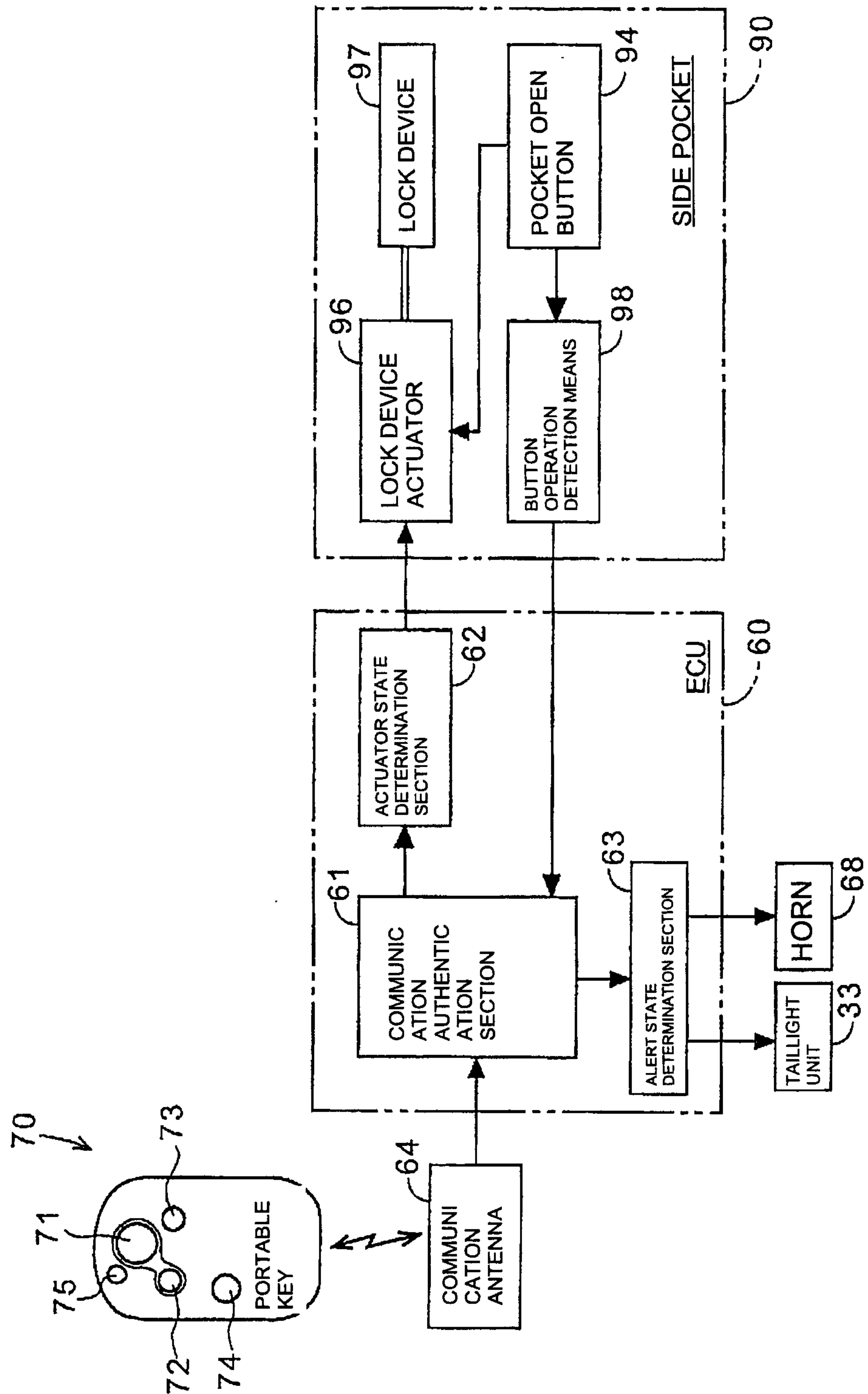


FIG. 4

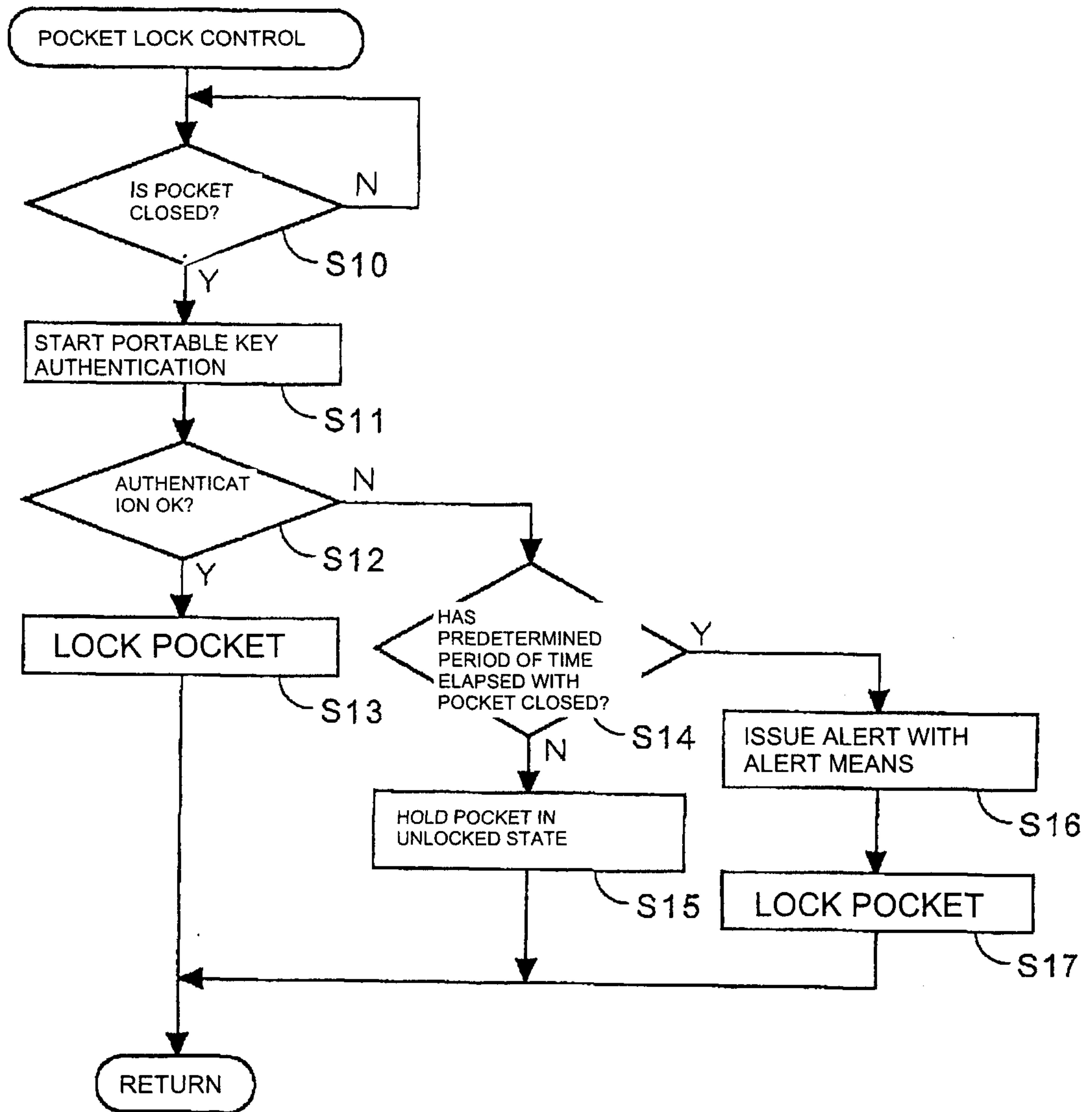


FIG. 5

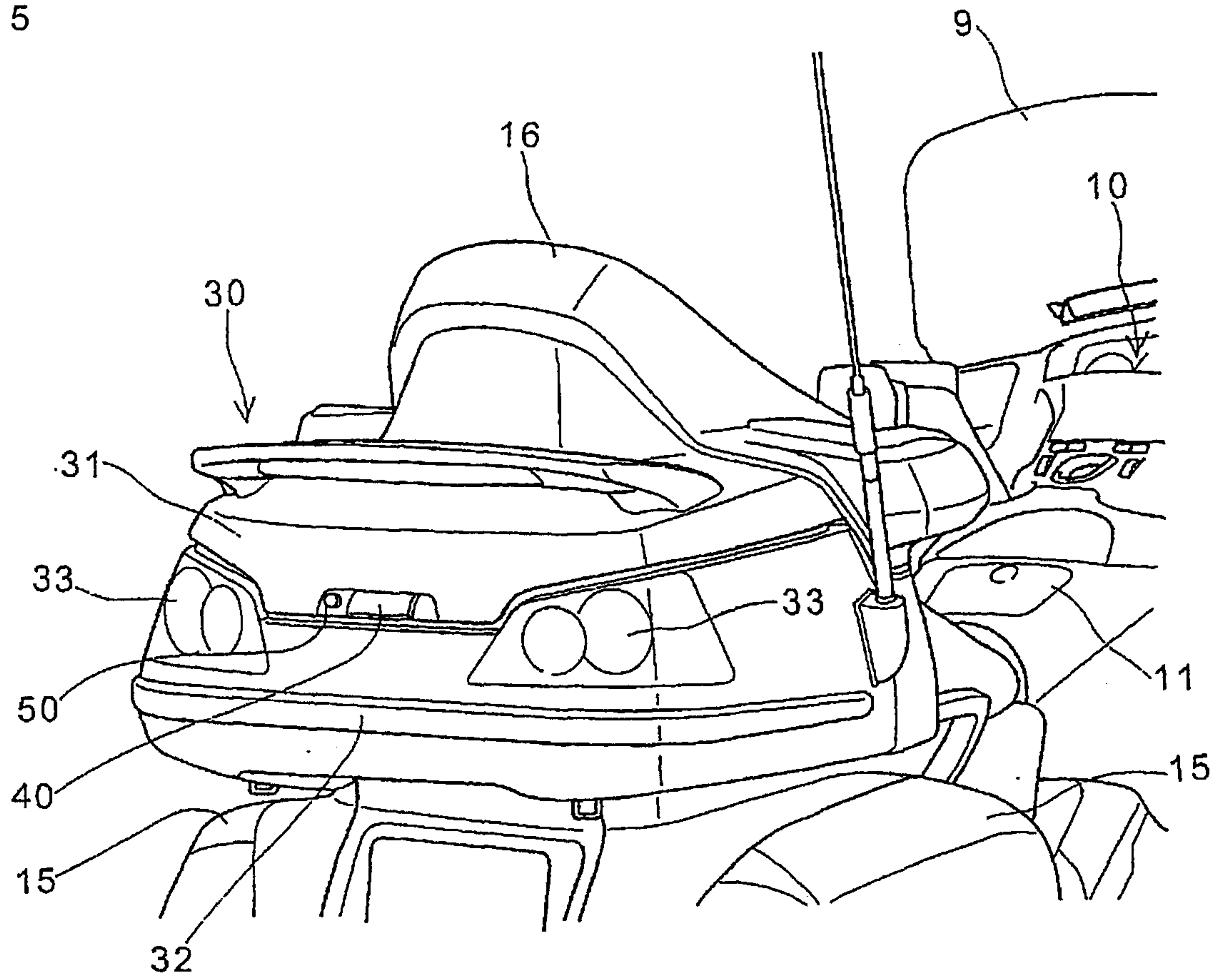


FIG. 6

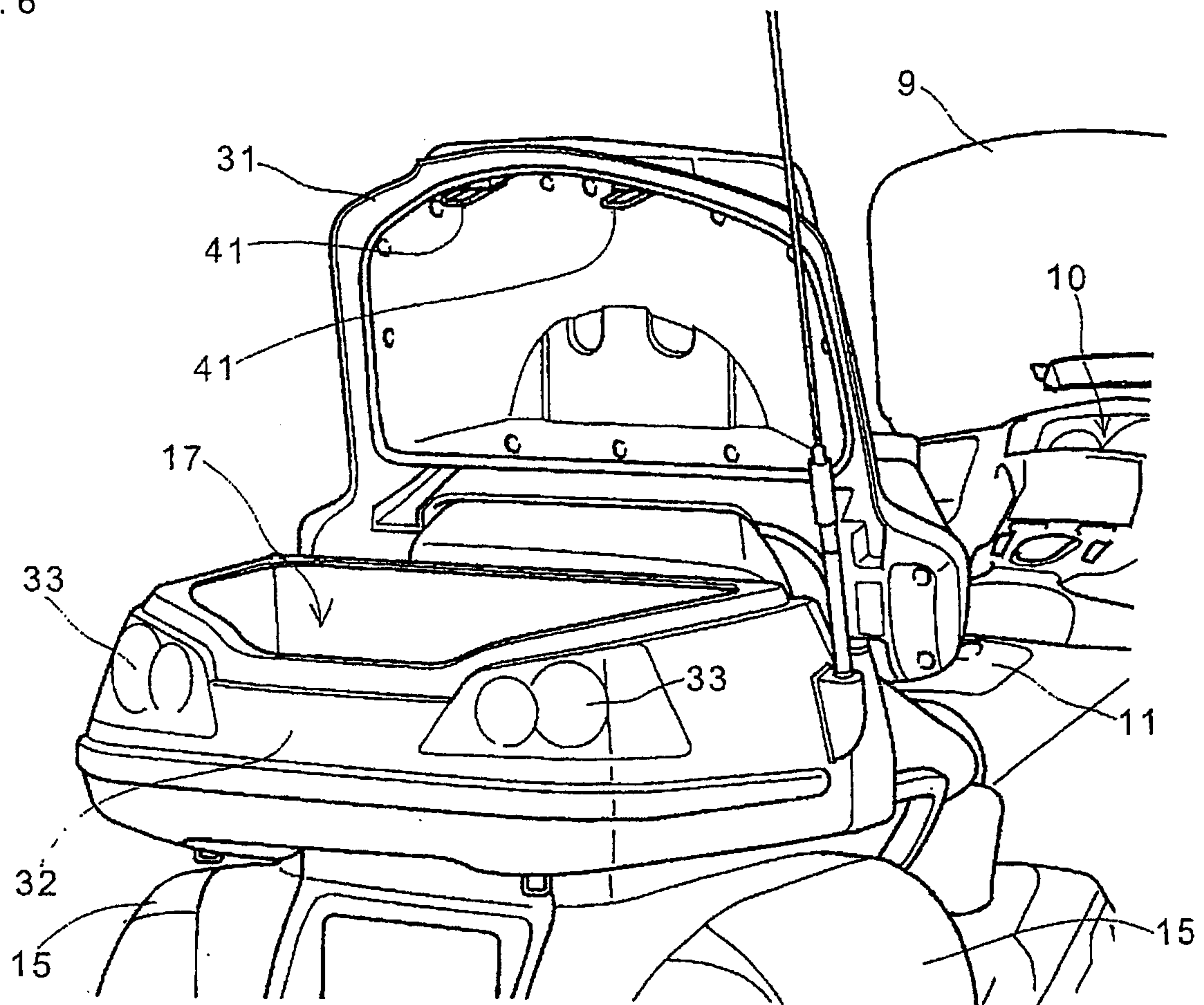


FIG. 7

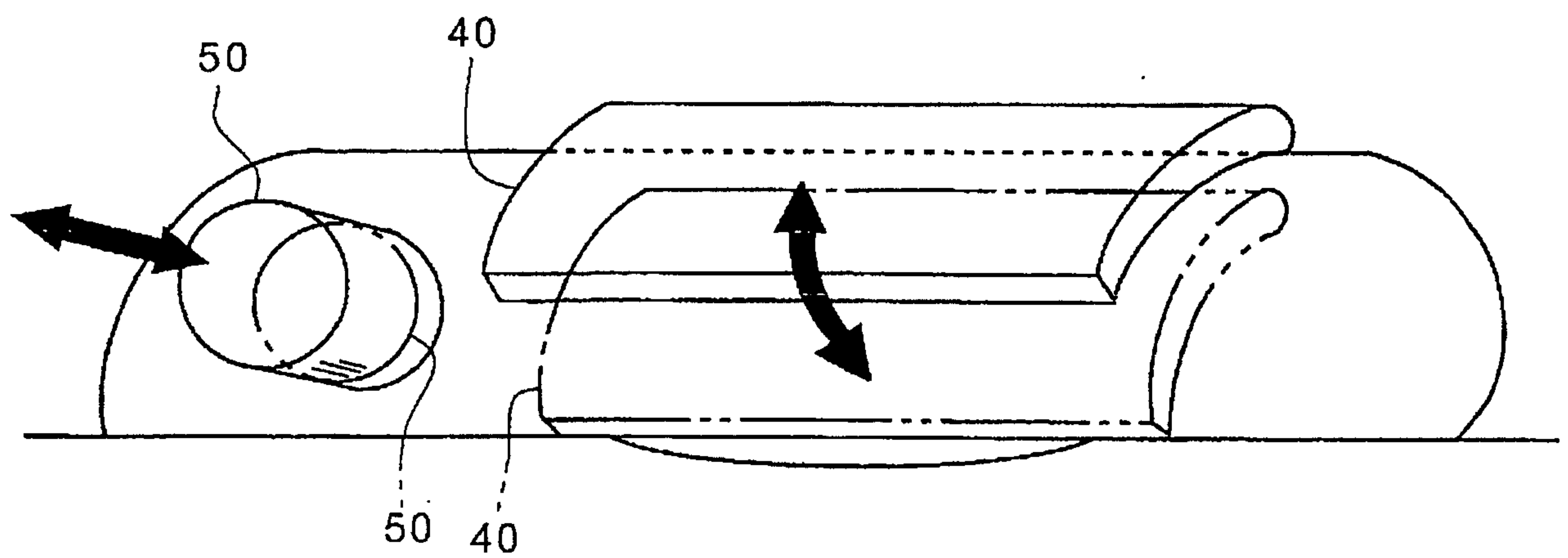


FIG. 8

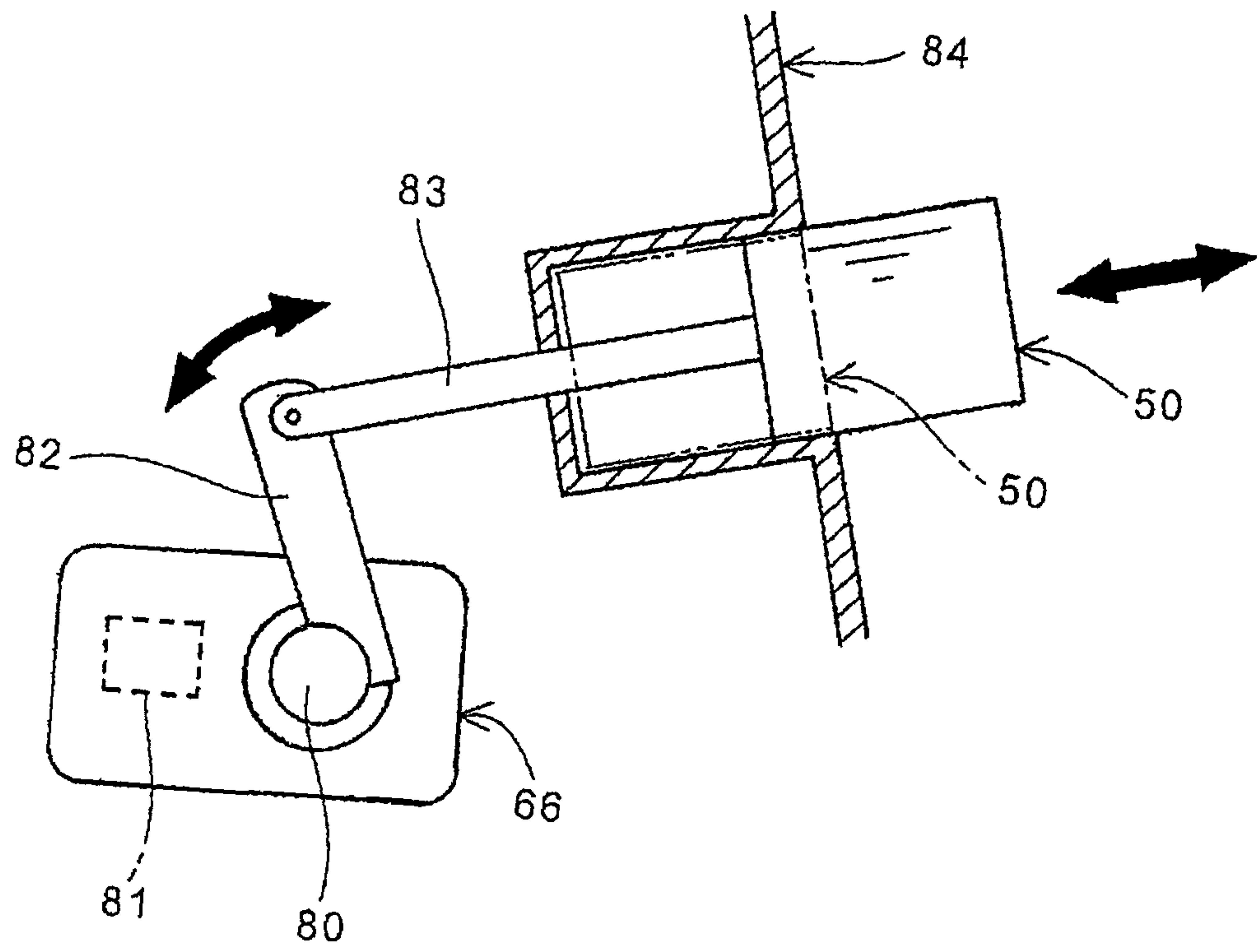


FIG. 9

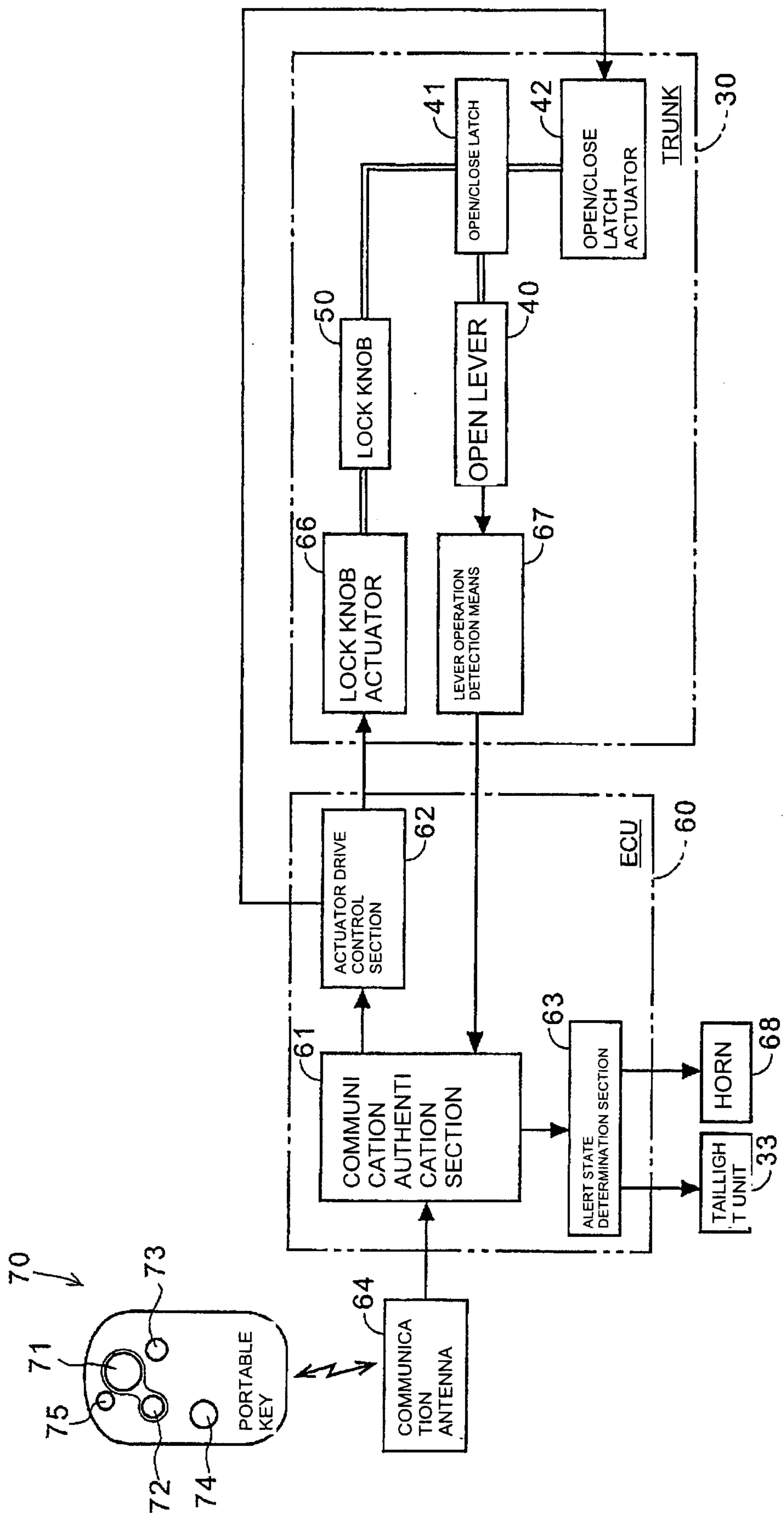


FIG. 10

