An aid for parking vehicles monitors the distance between an approaching vehicle and a predetermined parking position by transmitting signals and measuring the time elapsed for the signals to be reflected. A visual and/or audible signal is generated when the vehicle reaches the predetermined parking position. The aid incorporates a separate radiation sensor for remote operation (turn on) of the parking aid.
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Vehicle Parking Aid

The invention relates to a vehicle parking aid.

The invention relates more particularly to a vehicle parking aid for indicating to a vehicle driver when the vehicle must be stopped when approaching a wall or barrier at one end of a parking position or parking bay. Proposals have already been made in which the parking aid is arranged to transmit signals towards the vehicle and to measure the time elapsed until the receipt of a reflected signal to calculate the separation between the vehicle and the wall or barrier. When the separation reduces to a minimum safe or "set" parking distance, the parking aid provides a signal, for example illumination of a red light, so that the driver stops the car. The aid may be arranged to illuminate a green light, say, when the separation is greater than the safe distance to provide the driver with a signal to indicate that the vehicle may be moved closer to the wall or barrier.

In many situations, it is not convenient to connect the parking aid to an electric mains supply and when a vehicle is not entering a parking area it is wasteful.
to have the parking aid powered up and possibly a
green lamp permanently switched on. This is
especially a problem in the case of the aid being
battery powered. A proposal has been made to arrange
the parking aid to respond to changes in ambient light
to switch on. Such an arrangement works well if the
aid is in a garage and arranged so that opening of a
garage door significantly increases the ambient light
to which the parking aid responds to be switched on.

Alternatively, the head lights of the vehicle can be
switched on or flashed as the vehicle approaches the
parking area to switch on the parking aid. However,
parking areas may not always be enclosed or provided
with a door entry. It may also be desirable for the
vehicle to be reversed into the parking area.

Problems therefore arise where ambient light in the
parking area is not simply altered or related to the
likely approach of a vehicle or the lights of the
vehicle are not able to cause the parking aid to
switch on.

It is an object of the invention to overcome or at
least reduce this problem.

According to the invention there is provided a
vehicle parking aid comprising a housing arranged to be fixed at an end of a parking area, a transmitter mounted in the housing for transmitting signals towards an approaching vehicle, a receiver mounted in the housing for receiving the transmitted signals after they have been reflected from the vehicle, timer means for measuring the times elapsed for passage of the signal from the transmitter to the receiver, and computing means for determining from the elapsed times the separation of the vehicle from the end of the parking area and for energising a visual indicator when the separation corresponds to a minimum parking distance for the vehicle, including a separate radiation sensor connected to the parking aid for responding to signals transmitted from or reflected by the vehicle which are independent of changes in the ambient light and for turning on the parking aid.

The radiation sensor may be an acoustic sensor arranged to respond to sound generated by a vehicle horn. The sensor may be arranged to respond only to a chosen pattern of signals so as to discriminate from extraneous signals in the general vicinity of parking aid.

The parking aid may be turned off automatically a few minutes after it has been turned on.
The radiation sensor may be a radio signal sensor or any suitable sensor responsive to signals transmitted from the vehicle.

A vehicle parking aid according to the invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is an isometric view of the parking aid; and

Figure 2 is a schematic diagram of components of the parking aid.

Referring to the drawings, in Figure 1 the parking aid comprises a housing 10 which is normally fixed on an end wall of a vehicle garage at a level visible to the driver of the vehicle. An ultrasonic transmitter 11 is mounted at the bottom of the housing next to an ultrasonic receiver 12. The transmitter is arranged to direct signals towards an approaching vehicle and signals reflected from the vehicle are received by the receiver 11. A timing circuit is used to measure the elapsed time between the sending of the transmitted signals and the received signals for a computer which produces output signals corresponding to the instantaneous separation between the vehicle and the end wall. Three lamps are provided, a green lamp 13 to indicate the vehicle may move towards the end wall,
an amber lamp 14 to indicate the vehicle may move cautiously or slowly towards the end wall, and a red lamp 15 to indicate the vehicle should be stopped to prevent it touching the end wall. Further, sensors 16 and 17 are mounted on the housing to respond to any significant increase in ambient light, as may occur if the vehicle head lights are switched on and directed towards the housing 10, and respond to hooting of the vehicle horn, respectively.

In Figure 2, the transmitter 11 and the receiver 12 are connected via the timer circuit 18 to the computer 17. The computer 19 controls the energisation of the lamps 13, 14 and 15, as described, when the vehicle is moving towards the end wall. The computer and the other components are energised by a battery power pack 18 which normally maintains only the receivers 16 and 17 active until they receive appropriate the light or the acoustic signals, caused any significant increase in ambient light or a vehicle horn. The receiver 16 or 17 will then cause the activation of the parking aid, usually for say 2 or 3 minutes, so that the vehicle driver can be advised of the progress of the vehicle into the parking area.

The receiver 16 is light sensitive in the described parking aid, but both the receivers 16 and 17 may be
arranged to respond to a certain pattern of changes in ambient light and noise signals, respectively. Thus, say two half or one second flashes of the head lights may activate the receiver 16 to turn the parking aid on, or likewise two half second hoots on the vehicle horn may be used to represent an activating pattern. By providing certain patterns of response, the parking aid will not respond to extraneous changes which may be caused by sunlight reflections or horn soundings by passing motorists, for example. However, as described, the parking aid will effectively be turned off automatically anyway after a few minutes even if it is turned on by some extraneous changes in light or noises.

The receiver 12 may be replaced by or an additional receiver may be added to the parking aid which responds to certain ultrasonic radiation, or to other radiation including a low energy radio signal for example. For activating this additional receiver, the vehicle is fitted or preferably the vehicle driver provided with a small relevant hand-holdable transmitter which is used, by pointing the transmitter towards the parking aid, as the vehicle approaches the wall, to activate the parking aid.
In an alternative embodiment, the aid is arranged to be turned on when the sensor receives signals reflected by the vehicle. In this embodiment, an ultrasonic generator is provided in or near the parking aid housing and transmits signals for say one tenth of a second every two or three seconds. The or any reflected radiation is monitored for time elapses between transmission and receipt by the receiver 12 during the tenth of a second "bursts". If the distance of a reflect object is changing (as would be the case of a vehicle moving towards the parking aid), the parking aid is automatically turned on.

The parking aid, as well as providing visual indications as described may also generate appropriate different sounds indicative of the distances of the vehicle from the safe parking position.
Claims

1. A vehicle parking aid comprising a housing arranged to be fixed at an end of a parking area, a transmitter mounted in the housing for transmitting signals towards an approaching vehicle, a receiver mounted in the housing for receiving the transmitted signals after they have been reflected from the vehicle, timer means for measuring the times elapsed for passage of the signal from the transmitter to the receiver, and computing means for determining from the elapsed times the separation of the vehicle from the end of the parking area and for energising a visual indicator when the separation corresponds to a minimum parking distance for the vehicle, including a radiation sensor connected to the parking aid for responding to signals transmitted from or reflected by the vehicle which are independent of changes in the ambient light and for turning on the parking aid.

2. A vehicle parking aid according to claim 1, in which the radiation sensor is an acoustic sensor arranged to respond to sound generated by a vehicle horn.

3. A vehicle parking aid according to claim 1, in which the radiation sensor is a light sensor.
4. A vehicle parking aid according to claim 1, in which the sensor is a radio signal sensor.

5. A vehicle parking aid according to any one of claims 1 to 4, in which the sensor is arranged to respond only to a chosen pattern of signals so as to discriminate from extraneous signals in the general vicinity of parking aid.

6. A vehicle parking aid according to any of claims 1 to 5, in which the parking aid is turned off automatically a few minutes after it has been turned on.
AMENDED CLAIMS
[received by the International Bureau on 3 September 1992 (03.09.92);
original claim 1 amended; other claims unchanged (1 page)]

1. A vehicle parking aid comprising a housing arranged to be fixed at an end of a parking area, a transmitter mounted in the housing for transmitting signals towards an approaching vehicle, a receiver mounted in the housing for receiving the transmitted signals after they have been reflected from the vehicle, timer means for measuring the times elapsed for passage of the signal from the transmitter from the elapsed times the separation of the vehicle from the end of the parking area and for energising a visual indicator when the separation corresponds to a minimum parking distance for the vehicle, in which the parking aid is normally turned off, and including a radiation sensor connected to the parking aid for responding to signals transmitted from or reflected by the vehicle which are independent of changes in the ambient light and for turning on the parking aid.

2. A vehicle parking aid according to claim 1, in which the radiation sensor is an acoustic sensor arranged to respond to sound generated by a vehicle horn.

3. A vehicle parking aid according to claim 1, in which the radiation sensor is a light sensor.
**INTERNATIONAL SEARCH REPORT**

**International Application No.** PCT/GB 92/00696

I. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 G01S15/93; G08G1/0962

II. FIELDS SEARCHED

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Minimum Documentation Search

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched

III. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>US, A, 4 785 429 (FOLWELL ET AL.) 15 November 1988 see abstract see column 1, line 12 - column 3, line 68; figures 1, 3, 4</td>
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<td>US, A, 4 305 060 (APPLE ET AL.) 8 December 1981 see abstract see column 1, line 6 - line 20 see column 3, line 35 - column 4, line 31</td>
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<td>US, A, 4 624 076 (SCHOEMAN) 25 November 1986 see abstract see column 3, line 58 - line 61</td>
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IV. CERTIFICATION

Date of the Actual Completion of the International Search: 13 JULY 1992

Date of Mailing of this International Search Report: 21.07.92

International Searching Authority: EUROPEAN PATENT OFFICE

Signature of Authorized Officer: Francesco Zaccà
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