Example Provisional Patent Application

#2 Bicycle Carrier

This Provisional Patent Application was eventually re-written and filed as a utility (non-provisional) patent application in the U.S. Patent Office. The patent was eventually granted as **US Patent No. 7,688,187**

The following Example is provided for educational purposes only in connection with the informational **Guide**:

![Guide to Writing a Provisional Patent Application](image)

*Courtesy of:*

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 C.F.R. § 1.53(c)

INVENTOR(S)

<table>
<thead>
<tr>
<th>Given Name (first and middle [if any])</th>
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Additional Inventors are being named on the separately numbered sheets attached hereto.

TITLE OF THE INVENTION (500 Characters Max)

SENSOR FOR VEHICLE EXTERIOR LOADS

CORRESPONDENCE ADDRESS

☐ The address corresponding to Customer Number: 27305

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

ENCLOSED APPLICATION PARTS (Check All That Apply)

☐ Application Data Sheet. See 37 C.F.R. 1.76

☒ Specification Number of Pages 9

☐ Drawing(s) Number of Sheets 5

Fees Due: Filing Fee of $200 ($100 for small entity). If the specification and drawings exceed 100 sheets of paper, an application size fee is also due, which is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

METHOD OF PAYMENT OF FILING FEES AND APPLICATION SIZE FEE FOR THIS PROVISIONAL PATENT APPLICATION

☐ Applicant Claims small entity status. See 37 C.F.R. 1.27.

☒ A check or money order is enclosed to cover the filing fee and application size fee (if applicable)

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number ____________________________

☐ A duplicative copy of this form is enclosed for fee processing.

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☐ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: ____________________________

SIGNATURE ____________________________ Date: 11-7-05

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Registration No: 36003

Docket No: 60715-001

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 3 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, US Patent and Trademark Office, U.S. Department of Commerce, PO BOX 1450 Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, PO BOX 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.
SENSOR FOR VEHICLE EXTERIOR LOADS

BACKGROUND OF THE INVENTION

[0001] **Field of the Invention:**

The invention relates generally to an alarm system for loads carried on the outside of a vehicle, such as bicycles, canoes, cargo, and the like. More specifically, the invention relates to a directional proximity sensor which can be mounted and removed quickly to an exterior carried load and which produces a visual and/or audible warning inside the vehicle in the event of an on-coming obstruction, such as a low overhead opening.

[0002] **Related Art:**

It is an unfortunate but all too common occurrence where a driver returns from a trip with something tall mounted to the vehicle top, and forgetfully pulls into a garage or carport causing the roof-top load to strike the garage opening causing severe damage to the load, the vehicle and/or the garage. Because roof-top mounted cargo is generally out of view of the driver, and quite often much time lapses after the cargo is placed on the roof top, it is entirely understandable that the driver has forgotten that the roof-top cargo substantially increases the overhead clearance space needed for the vehicle. This is especially problematic with large vans and SUV’s whose normal overall height may be only inches shorter than the clearance of a standard residential garage. Thus, practically any cargo mounted to the roof of a van or SUV is likely to exceed the garage clearance.

[0003] A similar problem exists with any load mounted to the outside of a vehicle. For example, an object mounted to the rear exterior of a vehicle can be damaged when backing up, and an object mounted to the vehicle front can pose dangers in that direction.

[0004] The prior art has taught a variety of devices to remind the driver that a tall load is mounted to the roof. Examples of passive devices include small signs that the driver may dangle from the rear view mirror whenever the roof-top is occupied with a load. Other passive techniques have included attaching signage inside the garage door so that when the garage door opens, the signage reminds the driver that a load is on the vehicle. These proposals are only marginally effective as they depend upon an
alert driver. Examples of active warning systems include the use of radio frequency transmitters and receivers, with the transmitter being mounted in the garage and the receiver mounted upon the vehicle roof-rack or other vehicle-top structure. When a vehicle moves into range of the transmitting garage or carport, the alarm is triggered at the receiver end thus reminding the driver of the roof-top load so as to avoid a collision. A problem with this technique, however, is that it is only effective when the driver approaches his or her own garage which contains the transmitter device. If the driver attempts to pull into someone else's garage or otherwise approaches a structure with low overhang, the receiver portion of the in-vehicle the alarm system is not triggered.

[0005] The prior art also teaches the installation of permanent proximity sensors to a vehicle rear or front end to act as a warning system. These permanently affixed sensors are only effective to protect the vehicle per se. If a load is affixed to the vehicle top, such a sensor is likely ineffective to warn of an oncoming overhead structure. Likewise, if a long load, such as an extension ladder or a canoe, extends beyond the vehicle end, the proximity sensor does not adjust for the extended length.

[0006] Accordingly, there exists a need for a method and apparatus for alerting the driver of a vehicle carrying outside-mounted cargo that the vehicle is approaching an obstruction and that a collision with the cargo is imminent, and furthermore for such a method and apparatus that is adaptable to different load sizes and mounting positions on the vehicle.

SUMMARY OF THE INVENTION AND ADVANTAGES

[0007] The subject invention comprises a method and apparatus for protecting exterior mounted vehicle-top cargo such as bicycles, canoes, luggage, and the like from being damaged in transit as a vehicle approaches a structure without sufficient clearance. The invention employs a proximity sensor mounted to the cargo, which may be powered through the electrical system of the vehicle, and that provides a visual and/or audible alarm inside the vehicle whenever the proximity sensor detects an obstruction in its path. A quickly attachable/detachable bracket system enables the subject invention to be readily adaptable between various type load configurations, such as between bicycles, canoes, merchandise, luggage, and the like, and overcomes
the shortcomings and disadvantages found in the prior art by providing a universal system which is always on duty and does not depend upon a counterpart transmitter or receiver being mounted on a garage or other obstruction.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0008] These and other features and advantages of the present invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

[0009] Figure 1 is a fragmentary perspective view showing a bicycle mounted in a roof-rack on top of a vehicle, and including a sensor assembly according to the subject invention;

[0010] Figure 2 is a fragmentary view of a steering assembly for a typical bicycle;

[0011] Figure 3 is a simplified view showing a bicycle mounted on a vehicular roof-rack and poised to enter a low overhead clearance garage;

[0012] Figure 4 is a front elevation view of an exemplary sensor assembly for bicycle mounted applications;

[0013] Figure 5 is a view as in Figure 4 but showing the stem clamp in an open position;

[0014] Figure 6 is an end view of the sensor assembly as viewed from lines 6-6 in Figure 4 and showing a bicycle stem assembly in phantom;

[0015] Figure 7 is a view as in Figure 6, but showing the handlebar clamp tightened as in an operative condition; and

[0016] Figure 8 is a simplified view showing a canoe mounted to the roof of a vehicle and fitted with an alternative embodiment of the subject sensor assembly for detecting low overhead clearance objects such as a garage door.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

[0017] Referring to the Figures, wherein like numerals indicate like or corresponding parts throughout the several views, an exemplary bicycle is generally shown at 10 mounted to the roof-top 12 of a vehicle, generally indicated at 14. For purposes of illustration and not to be in any way limiting, the following description
will make reference to the roof-top 12 application of exterior mounted cargo. However, it will be appreciated that the invention is equally applicable to cargo mounted on the rear, front, or any other exterior location of a vehicle 14. Typically, but not necessarily, the roof-top 12 is fitted with a roof-rack, generally indicated at 16, or other structure for stabilizing and supporting a load, such the bicycle 10.

[0018] The bicycle 10, which is used in Figures 1-7 as but one example of a vehicle-top load, is of the variety including handlebars 18 comprised of a straight or contoured tubular shaft having hand grips 20 at the outer ends thereof. The specific shape of the handlebars 18 is not particularly relevant to this invention. Often, the handlebars 18 will also carry control features 22 which might comprise brake levers, shift levers, headlights, cycle computers and the like.

[0019] Referring now to Figure 2, a typical bicycle steering construction is shown with the handlebars 18 securely retained in a sleeve 24 which forms part of the stem assembly, generally indicated at 26. The stem assembly 26 is secured within a head tube 28 (Figure 1) using a headset which is well-known in the art. The stem assembly 26 can take many shapes and configurations, but generally comprises a column member 30 which seats down into the head tube, and a lateral member 32 (a stem) which interconnects the steer tube to the handlebar 18.

[0020] The subject invention comprises a sensor assembly, generally indicated at 34 in Figures 1 and 3. In the preferred embodiment, the sensor assembly 34 is mounted to the stem assembly 26 of the bicycle 10 which not only provides a stable, secure mount, but is also generally at or near the highest point of the bicycle 10. The sensor assembly 34 includes a proximity sensor with a sensor head for generating signals in response to the presence of a physical object occupying space within its sensing range. While the specific technical details embodied within the proximity sensor can take any of the known forms, one such example of a proximity sensor which is capable of providing satisfactory results within the context of this invention may be found in US Patent No. 6,798,217 to Scheible, issued September 28, 2004. The entire disclosure of the Scheible ‘217 patent is hereby incorporated by reference and relied upon.

[0021] The sensing range of the sensor assembly 34 is depicted by broken lines 36. Because the sensing range 36 is directionally specific, it is highly dependent upon the
orientation of the sensor assembly 34. Thus, a stable, secure mount to the bicycle 10 (or other cargo structure) is mandatory. In other words, if the sensing range 36 angles up or down or sideways, as may be expected to happen in the jarring high wind environment in a vehicle-top application, the effectiveness of the sensor assembly 34 can be severely compromised.

[0022] Toward this end, the sensor assembly 34 is preferably outfitted with a bracket assembly, generally indicated at 38 in Figures 4-7, that provides a secure grip to the bicycle 10 without marring the surface finish of the bicycle 10 nor damaging the sensitive electrical components within the proximity sensor. The bracket assembly 38 includes a tower 40 which joins directly to the proximity sensor. The tower 40 may be a rigid member as shown in the Figures, or may be articulated at one or more locking joints to allow adjustment of the sensing range 36 after the assembly 34 has been mounted to a bicycle 10. The lower end of the tower 40 includes a saddle 42 adapted to seat over the lateral member 32 of the stem assembly 26. The saddle 42 can be padded with a weather-resistant material such as the foam strip 44 depicted in Figures 4 and 5. A stem clamp 46 opposes the saddle 42 and includes a foam pad 48 for gripping the underside of the lateral member 32 opposite the saddle 42. The stem clamp 46 may be pivoted at 50 in a jaw-like fashion to facilitate attachment and detachment to the stem assembly 26. Although any quick-acting clamp arrangement may be suitable, Figures 4 and 5 depict one method for adjustably clamping the sensor assembly 34 to various sized stems 26. This includes a threaded bolt 52 which carries at its head a cam lock 54. The bolt 52 is adapted for threadably engaging a nut 56 seated in the tower 40. Thus, the sensor assembly 34 can be quickly attached to and detached from a stem assembly 26 on a bicycle 10 by clamping about the lateral member 32. The adjustable nature of the bolt 52 and cam lock 54 enable adjustment to fit various sized bicycle stems 26.

[0023] The tower 40 may also include a pair of extending wings 58 which carry at their respective ends a handlebar clamp, generally indicated 60. The handlebar clamps 60 are perhaps best shown in Figure 6 and 7 and comprise the elements of the bracket assembly 38 which stabilize the sensor assembly 34 from sideways motion when affixed to a bicycle 10. The handlebar clamps 60 each include a flexible strap 62 affixed to the underside of the respective wings 58. Those skilled in the art,
however, will readily appreciate other fixation techniques and arrangements for the straps 62. The flexible straps 62 may be of the cogged or toothed variety as depicted in Figures 6 and 7, but this is not a requirement. An over-center latch 64 includes a pawl 66 which can be finger actuated into gripping engagement with the strap 62. As shown in Figure 7, the straps 62 are wrapped around the handlebar 18 then pulled taught by rotating the latch 64 to an over-center condition whereupon the tension in the strap 62 maintains the handlebar clamps 60 in a locked condition. Accordingly, the orientation of the latch 64 relative to the handlebars 18 is significant so that this over-center condition can be achieved. The handlebar clamps 60 are thus effective, in combination with the stem clamp 46, to provide three spaced points of attachment upon the stem assembly 26 of the bicycle 10. Specifically, the stem clamp 46 prevents angular fore-aft (and vertical) displacement of the sensor head, whereas the two handlebar clamps 60 prevent angular side-to-side (and vertical) displacement. As a result, the sensor assembly 34 is securely held in position with its sensing range 36 maintained in a forward direction of the bicycle 10 and of the vehicle 14 so as to detect when an object approaches a collision path with the bicycle 10.

[0024] The sensor assembly 34 can be energized through an electrical connection made with the on-board vehicle 14 electrical system. For example, the sensor assembly 34 can be fitted with a cigarette lighter adapter 68 at the end of a long flexible cable 70. By plugging the adapter 68 into the receptacle 72 in the vehicle, electricity from the vehicle battery can be made available for use. Alternatively (not shown), the sensor assembly 34 can be hard-wired to the vehicle electrical system or powered from batteries or other self-contained or self-generated means.

[0025] In order to alert the driver of an impending collision, various warning indicia may be deployed. For example, Figure 3 suggests that a light bulb 74 and a speaker 76 can be positioned inside the vehicle 14 and activated upon the detection of an impending collision. Of course, the light bulb 74 and speaker 76 can be used separately as well as in combination, and can be computer controlled to provide intelligent feedback such as the distance to an impending collision, the height of an impending obstruction, and other such useful information. The light bulb 74 and speaker 76 are, for illustrative purposes, shown at the end of a long, flexible cable 78 which, like the cable 70, joins directly to the sensor assembly 34. Both cables 70, 78
may be routed into the passenger compartment through a door or window. Alternatively, the cable 78 could be eliminated if the light 74 and/or speaker 76 were enabled with a wireless connection to the sensor assembly 34.

[0026] Figure 8 depicts an alternative embodiment of the subject sensor assembly 34'. In this embodiment, the sensor assembly 34' is mounted to the leading end of a canoe 80. The canoe 80 is, of course, exemplary of any small watercraft or similarly shaped cargo (e.g., a roll of carpeting). The vehicle 14 is here, as in Figure 3, shown approaching a structure with a low overhead clearance, such a garage door. In this embodiment, the sensor assembly 34' may be electrically and functionally identical to that described in connection with the preferred embodiment above, however, the bracket assembly is replaced with a flexible mounting system. Here, the flexible mounting system is shown as a bra 82 made from a tuff but stretchable material and pulled over the forward end the canoe 80. The sensor assembly 34' is affixed to the bra 82 via a rigid mounting site 84. The mounting site 84 can, like the earlier described tower 40, be adjustable to perfect orientation of the sensing range 36' and then locked in position. The bra 82 can be held in a stretched, taught condition by adjustable retaining straps 86 which are shown extending rearwardly for attachment to a roof-rack or other anchoring points. In this condition, the sensor 34' is oriented so that the sensing range 36' projects forwardly of the canoe 80 and is oriented to detect the presence of an object (e.g., a garage door) at a height within contact range of the top of the canoe 80. When an object in the sensing range 36' is detected, the sensor assembly 34' alerts the vehicle occupants via the light bulb 74' and/or speaker 76' or by other indicia.

[0027] The invention has been described in an illustrative manner, and it is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation. Obviously, many modifications and variations of the present invention are possible in light of the above teachings. For example, the subject sensor assembly 34, 34' can be adapted to attach to any type of exterior mounted cargo and is not limited to the bicycle 10 and canoe 80 embodiments shown in the drawings nor to the exemplary roof-top application. It is, therefore, to be understood that within the scope of the appended claim, the invention may be
practiced otherwise than as specifically described. The invention is defined by the claim.
What is claimed is:

1. A sensor assembly for exterior mounted loads on a vehicle substantially as shown and described herein.
PATENT APPLICATION SERIAL NO

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

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