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A BICYCLE SIGNALLING SYSTEM

Field of Invention

The present invention relates generally to a bicycle signalling system for use with bicycles.

Background

Bicycles are typically equipped with reflectors as well as front and rear lights for increasing the conspicuity thereof when used in the absence of daylight. When executing a turn, convention signalling approach requires the cyclist to gesture using the arms to indicate the intended direction of turn to surround traffic. However, in the absence of proper lighting, the arms may not be visible. Extending ones limb into the path of passing traffic may also pose danger to the cyclist. Therefore, there is an apparent need for an improved bicycle signalling approach for addressing the foregoing problems.

Summary

In accordance with a first aspect of the invention, there is disclosed a bicycle signalling system couplable to a bicycle. The bicycle signalling system comprises a first signalling lamp a second signalling lamp, a controller and a user interface. The first signalling lamp is operable to switch between an activated state and a deactivated state with the first signalling lamp being illuminated when in the activated stated. The second signalling lamp is operable to switch between an activated state and a deactivated state with the second signalling lamp being illuminated when in the activated stated. The controller is in signal communication with the first signalling lamp and the second signalling lamp for controlling switching of each of the first signalling lamp and the second signalling lamp between the activated state and the deactivated state. The user interface is in signal communication with the controller and is disposed to enable interaction by a user of the bicycle therewith to provide one of a first command and a second command to the controller. The controller switches the first signalling lamp to the activated state when the first command is received and the second signalling lamp to the activated state when the second command is received. The controller switches the respective one of the first signalling lamp and the second signalling lamp to the deactivated state after lapse of a reference duration of being in the activated state. The first

signalling lamp and the second signalling lamp are disposable on the bicycle to provide visual directional indication when illuminated.

In accordance with a second aspect of the invention, there is disclosed a bicycle signalling system couplable to a bicycle. The bicycle signalling system comprises a first signalling lamp a second signalling lamp, a controller and a user interface. The first signalling lamp is operable to switch between an activated state and a deactivated state with the first signalling lamp being illuminated when in the activated stated. The second signalling lamp is operable to switch between an activated state and a deactivated state with the second signalling lamp being illuminated when in the activated stated. The controller is in signal communication with the first signalling lamp and the second signalling lamp for controlling switching of each of the first signalling lamp and the second signalling lamp between the activated state and the deactivated state. The user interface is in signal communication with the controller and is disposed to enable interaction by a user of the bicycle therewith to provide one of a first command and a second command to the controller. The controller alternates the first signalling lamp between the activated state and the deactivated state at a reference frequency when the first command is received and the second signalling lamp between the activated state at the reference frequency when the second command is received. The controller terminates alternating of the respective one of the first signalling lamp and the second signalling lamp between the activated state and the deactivated state after lapse of a reference duration of being in the activated state. The first signalling lamp and the second signalling lamp are disposable on the bicycle to provide visual directional indication when illuminated.

Brief Description of the Drawings

FIG. 1 shows a system flow diagram of a bicycle signalling system according to an embodiment of the invention;

FIG. 2 shows a partial rear perspective view of a bicycle with the bicycle signalling system of FIG. 1 being coupled thereto;

FIG. 3 shows a partial side elevation of the bicycle of FIG. 2 with the bicycle signalling system of FIG. 1 being coupled to the rear portion thereof; and

FIG. 4 shows a partial rear view of the bicycle of FIG. 2 with the bicycle signalling system of FIG. 1 being coupled to seat stays thereof.

Detailed Description

Reference will now be made in detail to an exemplary embodiment of the present invention, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction with the embodiment, it will be understood that they are not intended to limit the invention to these embodiments. On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims. Furthermore, in the following detailed description of embodiments of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be recognized by one of ordinary skill in the art that the present invention may be practiced without these specific details. In other instances, well-known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the embodiments of the present invention

An exemplary embodiment of the invention, a bicycle signalling system 20, is described with reference to FIGS 1 to 4. The bicycle signalling system 20 is preferably for use with a bicycle 22. However, a person skilled in the art will appreciate that the bicycle signalling system 20 is adaptable as other embodiments of the invention for use with other forms of fully and partially human-powered vehicles.

The bicycle signalling system 20 is coupled to the bicycle 22 when used in conjunction therewith. The bicycle signalling system 20 comprises a first signalling lamp 24, a second signalling lamp 26, a controller 28 and a user- interface 30.

The first signalling lamp 24 is operable to switch between an activated state and a deactivated state with the first signalling lamp 24 being illuminated when in the activated stated. Similarly, the second signalling lamp 26 operable to switch between an activated state and a deactivated state wit the second signalling lamp 26 being illuminated when in the activated

stated. The controller 28 is in signal communication with the first signalling lamp 24 and the second signalling lamp 26 for controlling switching of each of the first signalling lamp 24 and the second signalling lamp 26 between the activated state and the deactivated state.

The user interface 30 is in signal communication with the controller 28 and is disposed to enable interaction by a user of the bicycle 22 therewith to provide one of a first command and a second command to the controller 28. Preferably, the controller 28 switches the first signalling lamp 24 to the activated state when the first command is received, and the second signalling lamp 26 to the activated state when the second command is received. The controller 28 switches the respective one of the first signalling lamp 24 and the second signalling lamp 26 to the deactivated state after lapse of a reference duration 32 in the activated state. The first signalling lamp 24 and the second signalling lamp 26 are disposable on the bicycle 22 to provide visual directional indication when illuminated.

Each of the first signalling lamp 24 and the second signalling lamp 26 comprises one or more light emitting diodes (LED). Alternatively, the LED may be replaced with an incandescent lamp, a gas discharge lamp or the like light emitting means. Each of the first signalling lamp 24 and the second signalling lamp 26 is in one of wired and wireless communication with the controller 28. When in wired communication with the controller 28, each of the first signalling lamp 24 and the second signalling lamp 26 may contain its own power source (not shown), for example one or more flat cell batteries. Alternatively, each of the first signalling lamp 24 and the second signalling lamp 26 can receive electrical power from a common power source via the controller 28. When in wireless communication, each of each of the first signalling lamp 24 and the second signalling lamp 26 can contain a wireless receiver or is coupled to a common wireless receiver (both not shown) for receiving control signals from the controller 28 to switch between the activated state and the deactivated state. Further, each of the first signalling lamp 24 and the second signalling lamp 26 can contain a circuit board for controlling switching between the activated state and the deactivated state based on control signals received from the controller 28. Each of the first signalling lamp 24 and the second signalling lamp 26 is directly couplable to the bicycle 22 or is coupled via way of an interposer structure, for example a clip structure or Velcro bands.

It is preferred that the first signalling lamp 24 and the second signalling lamp 26 be coupled to the rear portion 32 of the bicycle 22, for example, proximal or adjacent the seat post 34 or the seat stay 36 of the bicycle 22. It is not precluded that the first signalling lamp 24 and the second signalling lamp 26 are structurally integratable with the seat post 34.

The first signalling lamp 24 and the second signalling lamp 26 can be structurally segregated or be structurally connected via an adapter (not shown) for coupling to the bicycle 22. However, it is important that the first signalling lamp 24 and the second signalling lamp 26 be inter-configured, when coupled to the bicycle 22, to provide directional indication when illuminated. For example, the first signalling lamp 24 is disposed adjacent the left seat stay of the bicycle 22 to provide left directional indication while the second signalling lamp 26 is disposed adjacent the right seat stay of the bicycle 22 to provide right directional indication. Further, each of the first signalling lamp 24 and the second signalling lamp 26 can be shaped, for example by arranging a cluster of LEDs in the shape of an arrow or triangle, to facilitate visual recognition of the directional indication provided thereby.

Alternatively, each of the first signalling lamp 24 and the second signalling lamp 26 is couplable to the front portion 40 of the bicycle 22, for example, the handlebar 42 of the bicycle 22. When coupled to the handlebar 42 of the bicycle 22, the first signalling lamp 24 is adaptable to extend along the periphery of the left extremity of the handlebar 42 while the second signalling lamp 26 is adaptable to extend along the periphery of the right extremity of the handle bar 42. Disposing the first signalling lamp 24 and the second signalling lamp 26 towards the extremities of the handlebar 42 provides sufficient spatial segregation therebetween to enable visual distinction between right and left directional indications. Further, disposing the first signalling lamp 24 and the second signalling lamp 26 towards the extremities of the handlebar 42 substantially mitigates the possibility or extent of the first signalling lamp 24 and the second signalling lamp 26 being covered by the hands of a user of the bicycle 22 when in use.

Each of the first signalling lamp 24 and the second signalling lamp 26 can further comprise one or more light guides to increase the surface of illumination (not shown). The light guides can be made of substantially transparent or partially translucent plastic, polymer or glass and

may be structurally rigid or flexible. When made from a structurally flexible polymeric material in a substantially planar structure, the light guide is adaptable to wrap around various parts of the bicycle 22.

The user interface 30 is preferably coupled to the handlebar 42 of the bicycle 22. When in use, a user of the bicycle 22 interacts with the user interface for providing the first command and the second command to the controller 28 by means of control signals thereto. The user interface 30 is preferably wired to the controller 28 for signal communication therewith. However, signal communication between the user interface 30 and the controller 28 can also be achieved wirelessly. Should wireless communication between the user interface 30 and the controller 28 be required, the user interface 30 can comprise a transmitter and a corresponding circuit for managing signal transmission to the controller. The user interface 30 comprises one of a multi-way switch, a toggle switch and a plurality of pushbutton switches to enable a user of the bicycle 22 to indicate signalling commands, for example the first command and the second command, for provision to the controller 28. The user interface 30 is preferably disposed along the handlebar 42 whereat the thumbs of the user of the bicycle 22 naturally rest when the hand of the user grips the handles of the handlebar 42. For example, the user interface 30 can contain a toggle switch presented and disposed on one side of the handlebar 42 proximal the stem of the bicycle 22. Alternatively, the user interface 30 can comprise at least one pushbutton presented and disposed on each side of the handlebar. In the latter example utilising pushbuttons (all not shown), the push button presented on the left side of the handlebar 42 is operable by the user to control the first signalling lamp 24 into providing a left directional indication while the pushbutton presented on the right side of the handlebar 42 is operable by the user to control the first signalling lamp 24 into providing a right directional indication. The user interface 30, or a portion thereof, can be structurally integrated with the controller 28.

The controller 28 comprises a circuit board 44. The controller 28 further comprises a transceiver (not shown) for wirelessly transmitting and receiving control signals should signal communication between the controller 28 and the user interface 30, the first signalling lamp 24 and the second signalling lamp 26 be performed wirelessly. In a first signalling approach where the respective one of the first signalling lamp 24 and the second signalling lamp 26

remain illuminated for providing directional indication, the circuit board 44 comprises a latch module 46 for maintaining the respective one of the first signalling lamp 24 and the second signalling lamp 26 in the activated state during the reference duration.

The circuit board 44 further comprises a timer module 48 for switching the respective one of the first signalling lamp 24 and the second signalling lamp 26 to the deactivated state at the lapse of the reference duration. As the bicycle signalling system 20 is used by a user on the bicycle prior to making or during a turn as directional indication to rear and peripheral traffic, the reference duration, being pre-determined, prevents the respective one of the first signalling lamp 24 and the second signalling lamp 26 from remain illuminated long after the bicycle has come out of the turn. Further, when the second command is received by the controller 28 when the first signalling lamp 24 is in the activated state, the controller 28 switches the first signalling lamp 24 to the deactivated state and the second signalling lamp 26 to the activated state to enable sudden directional change or correction of a wrong command given by the user via the user interface 30. The same applies when the first command is received by the controller 28 when the second signalling lamp 26 is in the activated state.

In the first signalling approach, the user interface 30 is operable for providing a terminate command to the controller 28. The controller 28 switches both the first signalling lamp 24 and the second signalling lamp 26 to the deactivated state when the terminate command is received. Additionally, the user interface is operable for providing a third command to the controller 28. This can be performed by a separate pushbutton, a dedicated position on a selector switch or by depressing, in tandem, the pushbuttons associated with the first command and the second command. When the third command is received by the controller 28, both the first signalling lamp 24 and the second signalling lamp 26 are switched to the activated state.

In a second signalling approach where the respective one of the first signalling lamp 24 and the second signalling lamp 26 a sequence of successive flash illumination is required for providing directional indication, the circuit board 44 further comprises a synchronous circuit module 50 functioning in conjunction with the latch module 46 for alternating the respective

one of the first signalling lamp 24 and the second signalling lamp 26 between the activated state and the deactivated state at the reference frequency during the reference duration to generate the sequence of successive flash illumination. The sequence of successive flash illumination can be likened to a strobe lighting effect.
The timer module 48 then terminates alternating of the respective one of the first signalling lamp 24 and the second signalling lamp 26 between the activated state and the deactivated state at the lapse of the reference duration.

In the second signalling approach, the controller 28 switches both the first signalling lamp 24 and the second signalling lamp 26 to the deactivated state when the terminate command is received by the controller 28 from the user interface 30. Additionally in the second signalling approach, when the third command is received by the controller 28, both the first signalling lamp 24 and the second signalling lamp 26 are alternated between the activated state and the deactivated state at the reference frequency during the reference duration to generate a sequence of successive flash illumination emanating from both the first signalling lamp 24 and the second signalling lamp 26.

The bicycle signalling system 20 further comprises a third signalling lamp 52 and a fourth signalling lamp 54, both in signal communication with the controller 28. The third signalling lamp 52 is operable to switch between an activated state and a deactivated state with the third signalling lamp 52 being configured to switch to the activated state when the first signalling lamp 24 is in the activated state. The fourth signalling lamp 54 is operable to switch between an activated state and a deactivated state with the second signalling lamp 54 being configured to the activated state when the second signalling lamp 26 is in the activated state. Each of the third signalling lamp 52 and the fourth signalling lamp 54 is illuminated when in the activated state.

When the third signalling lamp 52 and the fourth signalling lamp 54 is used in the bicycle signalling system 20, the third signalling lamp 52 mimics the illumination of the first signalling lamp 24 while the fourth signalling lamp 54 mimics the illumination of the second signalling lamp 26. Therefore, it is important that the third signalling lamp 52 and the first signalling lamp 24 are disposed on the same one side of the bicycle 22 while the fourth

signalling lamp 54 and the second signalling lamp 26 are disposed on the same the other side of the bicycle 22 to prevent confusion in directional indications provided thereby.

It is preferred that when the first signalling lamp 24 and the second signalling lamp 26 are disposed towards the rear portion 32 of the bicycle, the third signalling lamp 52 and the fourth signalling lamp 54 are disposed towards the front portion 40 of the bicycle, and vice versa.

The first signalling lamp 24, second signalling lamp 26, the third signalling lamp 52 and the fourth signalling lamp 54 are coupled to the controller via fixed soldered coupling or by a plurality of connectors (not shown). The plurality of connectors are detachable and therefore facilitate coupling and decoupling from the controller 28. The bicycle signalling system 20 can further comprise a central manifold (not shown) configured and adapted to interface the controller 28 with the first signalling lamp 24, second signalling lamp 26, the third signalling lamp 52 and the fourth signalling lamp 54 and whereto the plurality of connectors are couplable for signal communication with the controller 28. The central manifold is disposable to enable convenient access by the plurality of connectors of the first signalling lamp 24, second signalling lamp 26, the third signalling lamp 52 and the fourth signalling lamp 54.

The bicycle signalling system 20 can be used with auxiliary lighting means available on the bicycle 22. The auxiliary lighting means include front head lighting means and rear indicator lighting means. When use in conjunction with the rear indicator lighting means, the illumination provided by the first signalling lamp 24, second signalling lamp 26, the third signalling lamp 52 and the fourth signalling lamp 54 is preferably of a colour different from illumination colour of the rear indicator lighting means.

In a forgoing manner, a bicycle signalling system is described according to an exemplary embodiment of the invention. Although only one embodiment of the invention is disclosed in this document, it will be apparent to one skilled in the art in view of this disclosure that numerous changes and/or modifications can be made to the disclosed embodiment without departing from the scope and spirit of the invention.

Claims

1. A bicycle signalling system couplable to a bicycle, the bicycle signalling system comprising:

a first signalling lamp operable to switch between an activated state and a deactivated state, the first signalling lamp being illuminated when in the activated stated;

a second signalling lamp operable to switch between an activated state and a deactivated state, the second signalling lamp being illuminated when in the activated stated;

a controller in signal communication with the first signalling lamp and the second signalling lamp for controlling switching of each of the first signalling lamp and the second signalling lamp between the activated state and the deactivated state; and

a user interface in signal communication with the controller and being disposed to enable interaction by a user of the bicycle therewith to provide one of a first command and a second command to the controller, the controller switching the first signalling lamp to the activated state when the first command is received and the second signalling lamp to the activated state when the second command is received, the controller switching the respective one of the first signalling lamp and the second signalling lamp to the deactivated state after lapse of a reference duration in the activated state,

wherein the first signalling lamp and the second signalling lamp are disposable on the bicycle to provide visual directional indication when illuminated.

2. The bicycle signalling system as in claim 1, each of the first signalling lamp and the second signalling lamp comprising one of an incandescent lamp, a light emitting diode (LED) and a gas discharge lamp for providing illumination when in the activated state.

3. The bicycle signalling system as in claim 2, each of the first signalling lamp and the second signalling lamp further comprising a light guide.

4. The bicycle signalling system as in claim 1, the user interface comprising one of a multi-way switch, a toggle switch and a plurality of pushbutton switches.

5. The bicycle signalling system as in claim 1, the controller comprising a circuit board with a latch module for maintaining the respective one of the first signalling lamp and the second signalling lamp in the activated state during the reference duration, and a timer module for switching the respective one of the first signalling lamp and the second signalling lamp to the deactivated state at the lapse of the reference duration.

6. The bicycle signalling system as in claim 1, further comprising:

a third signalling lamp operable to switch between an activated state and a deactivated state, the first signalling lamp being illuminated when in the activated stated, the third signalling lamp being switched to the activated state when the first signalling lamp is in the activated state; and

a fourth signalling lamp operable to switch between an activated state and a deactivated state, the second signalling lamp being illuminated when in the activated state, the fourth signalling lamp being switched to the activated state when the second signalling lamp is in the activated state, the controller further being in signal communication with the third signalling lamp and the fourth signalling lamp.

7. The bicycle signalling system as in claim 6, each the third signalling lamp and the fourth signalling lamp being shaped and dimensioned for coupling adjacent the length extremities of a handlebar of the bicycle.

8. The bicycle signalling system as in claim 7, each of the first signalling lamp and the second signalling lamp being coupled proximal the rear portion of the bicycle.

9. The bicycle signalling system as in claim 1, each of the first signalling lamp and the second signalling lamp being in one of wired and wireless signal communication with the controller.

10. The bicycle signalling system as in claim 1, wherein when the second command is received by the controller when the first signalling lamp is in the activated state, the controller switches the first signalling lamp to the deactivated state and the second signalling lamp to the activated state, the controller maintaining the second signalling lamp in the activated state for the reference duration.

11. The bicycle signalling system as in claim 1, the user interface further being operable for providing a third command to the controller, the controller switching each of the first signalling lamp and the second signalling lamp to the activated state for the reference duration.

12. The bicycle signalling system as in claim 1, further comprising an adapter for coupling the first signalling lamp and the second signalling lamp to the bicycle.

13. A bicycle signalling system couplable to a bicycle, the bicycle signalling system comprising:

a first signalling lamp operable to switch between an activated state and a deactivated state, the first signalling lamp being illuminated when in the activated stated;

a second signalling lamp operable to switch between an activated state and a deactivated state, the second signalling lamp being illuminated when in the activated stated;

a controller in signal communication with the first signalling lamp and the second signalling lamp for controlling switching of each of the first signalling lamp and the second signalling lamp between the activated state and the deactivated state; and

a user interface in signal communication with the controller and being disposed to enable interaction by a user of the bicycle therewith to provide one of a first command and a second command to the controller, the controller alternating the first signalling lamp between the activated state and the deactivated state at a reference frequency when the first command is received and the second signalling lamp between the activated state at the reference frequency when the second

command is received, the controller terminating alternating of the respective one of the first signalling lamp and the second signalling lamp between the activated state and the deactivated state after lapse of a reference duration in the activated state,

wherein the first signalling lamp and the second signalling lamp are disposable on the bicycle to provide visual directional indication when illuminated.

14. The bicycle signalling system as in claim 13, each of the first signalling lamp and the second signalling lamp comprising one of an incandescent lamp, a light emitting diode (LED) and a gas discharge lamp for providing illumination when in the activated state.

15. The bicycle signalling system as in claim 14, each of the first signalling lamp and the second signalling lamp further comprising a light guide.

16. The bicycle signalling system as in claim 13, the user interface comprising one of a multi-way switch, a toggle switch and a plurality of pushbutton switches.

17. The bicycle signalling system as in claim 13, the controller comprising a circuit board with a synchronous circuit module for alternating the respective one of the first signalling lamp and the second signalling lamp between the activated state and the deactivated state at the reference frequency during the reference duration, and a timer module for terminating alternating of the respective one of the first signalling lamp and the second signalling lamp between the activated state and the deactivated state at the lapse of the reference duration.

18. The bicycle signalling system as in claim 13, further comprising:

a third signalling lamp operable to switch between an activated state and a deactivated state, the first signalling lamp being illuminated when in the activated stated, the third signalling lamp being switched to the activated state when the first signalling lamp is in the activated state; and

a fourth signalling lamp operable to switch between an activated state and a deactivated state, the second signalling lamp being illuminated when in the activated

state, the fourth signalling lamp being switched to the activated state when the second signalling lamp is in the activated state, the controller further being in signal communication with the third signalling lamp and the fourth signalling lamp.

19. The bicycle signalling system as in claim 18, each the third signalling lamp and the fourth signalling lamp being shaped and dimensioned for coupling adjacent the length extremities of a handlebar of the bicycle.

20. The bicycle signalling system as in claim 19, each of the first signalling lamp and the second signalling lamp being coupled proximal the rear portion of the bicycle.

21. The bicycle signalling system as in claim 13, each of the first signalling lamp and the second signalling lamp being in one of wired and wireless signal communication with the controller.

22. The bicycle signalling system as in claim 13, wherein when the second command is received by the controller when the first signalling lamp is in the activated state, the controller switches the first signalling lamp to the deactivated state and the second signalling lamp to the activated state, the controller maintaining the second signalling lamp in the activated state for the reference duration.

23. The bicycle signalling system as in claim 13, the user interface further being operable for providing a third command to the controller, the controller alternating each of the first signalling lamp and the second signalling lamp between the activated state and the deactivated state for the reference duration in response to the third command being received.

24. The bicycle signalling system as in claim 13, further comprising an adapter for coupling the first signalling lamp and the second signalling lamp to the bicycle.