

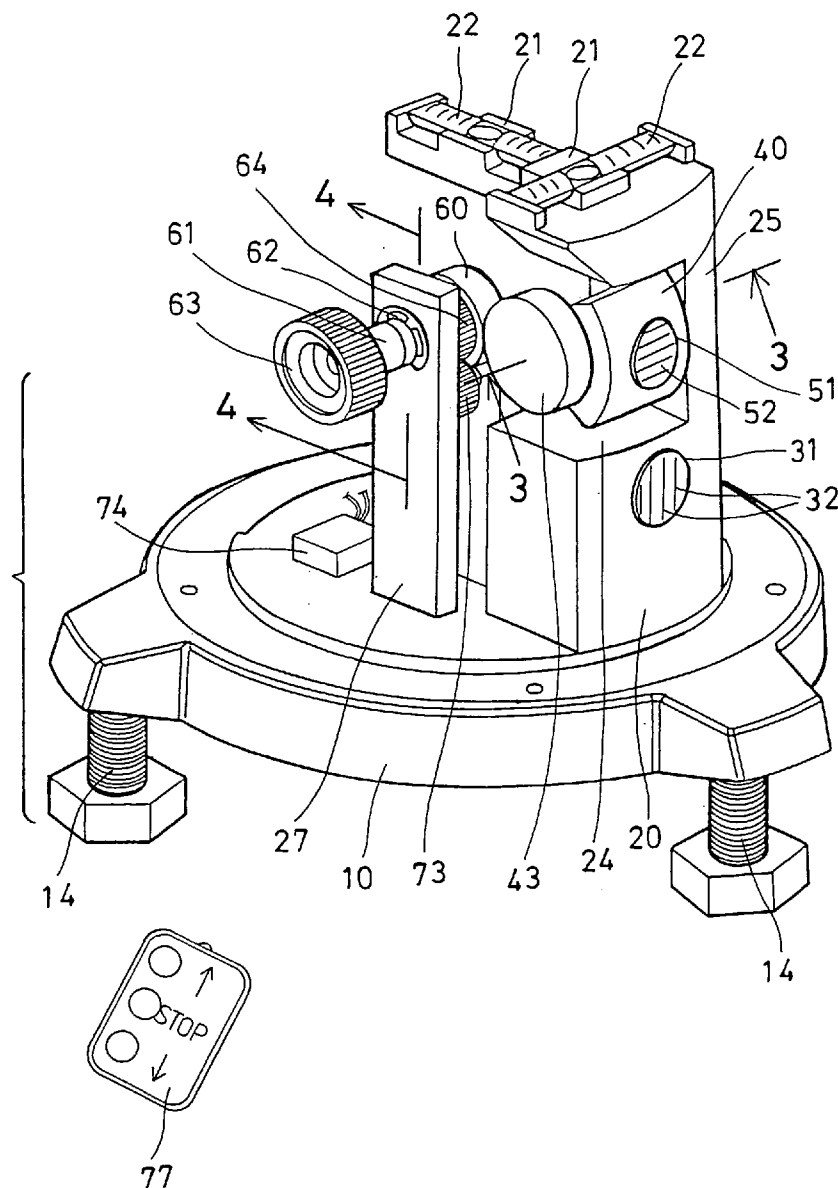


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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0166409 A1****Chou et al.**(43) **Pub. Date:****Aug. 4, 2005**(54) **LIGHT LEVELING DEVICE HAVING
REMOTE CONTROL****Publication Classification**(51) **Int. Cl.⁷** **G01C 5/00**(52) **U.S. Cl.** **33/290**(76) **Inventors: Chiu Yen Chou, Taichung (TW); Shu
Chen Chang, Taichung (TW)**(57) **ABSTRACT**

A light leveling device includes a stationary light instrument received in a housing, and a rotatable light instrument rotatably attached to the housing, to allow the rotatable light instrument to be rotated and adjusted relative to the housing and the stationary light instrument. A carrier is rotatably secured to the housing to support the rotatable light instrument, and a motor may be coupled to the carrier to rotate and adjust the carrier and the rotatable light instrument relative to the housing automatically. A remote control device may further be used to remotely control the motor.

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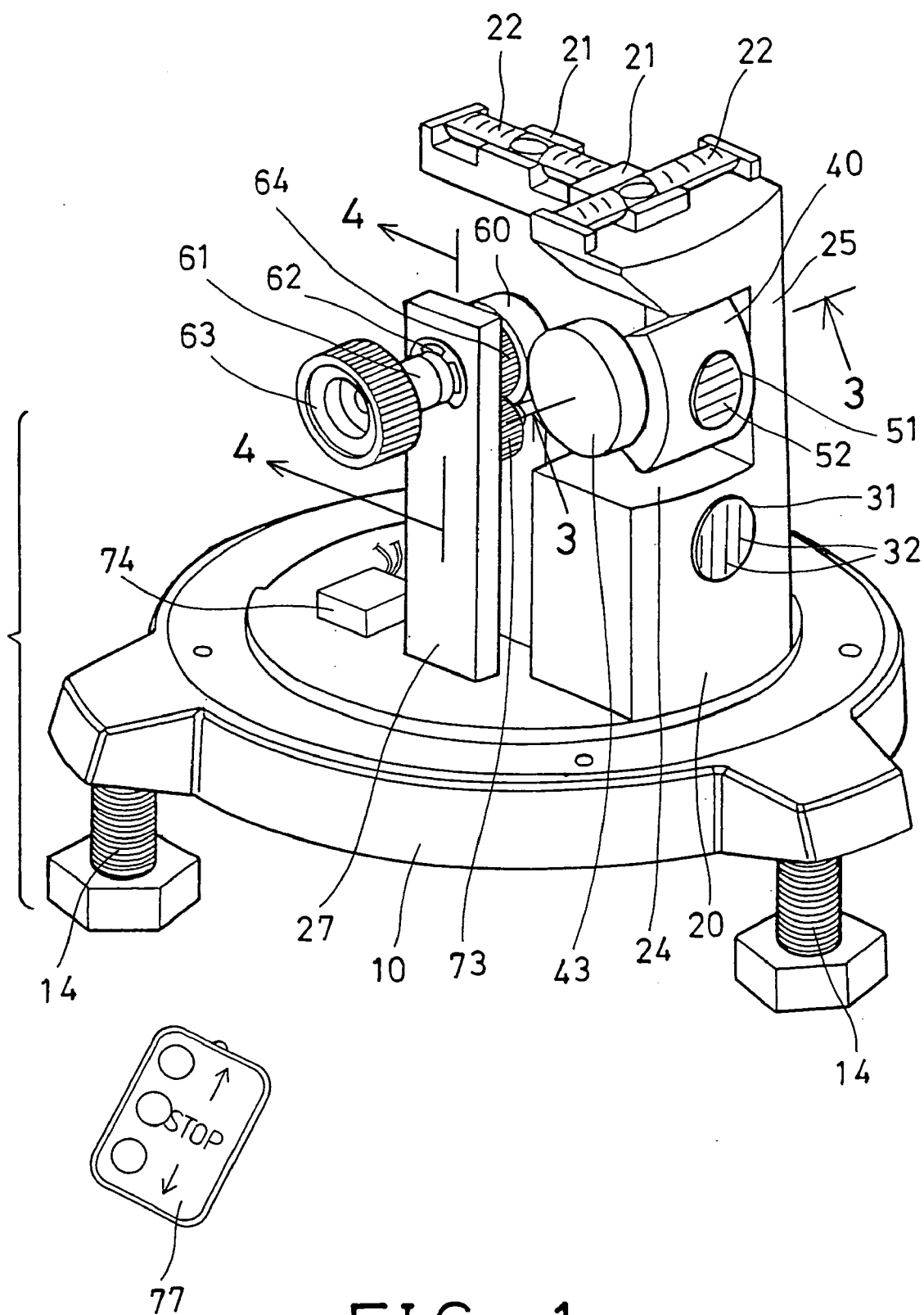


FIG. 1

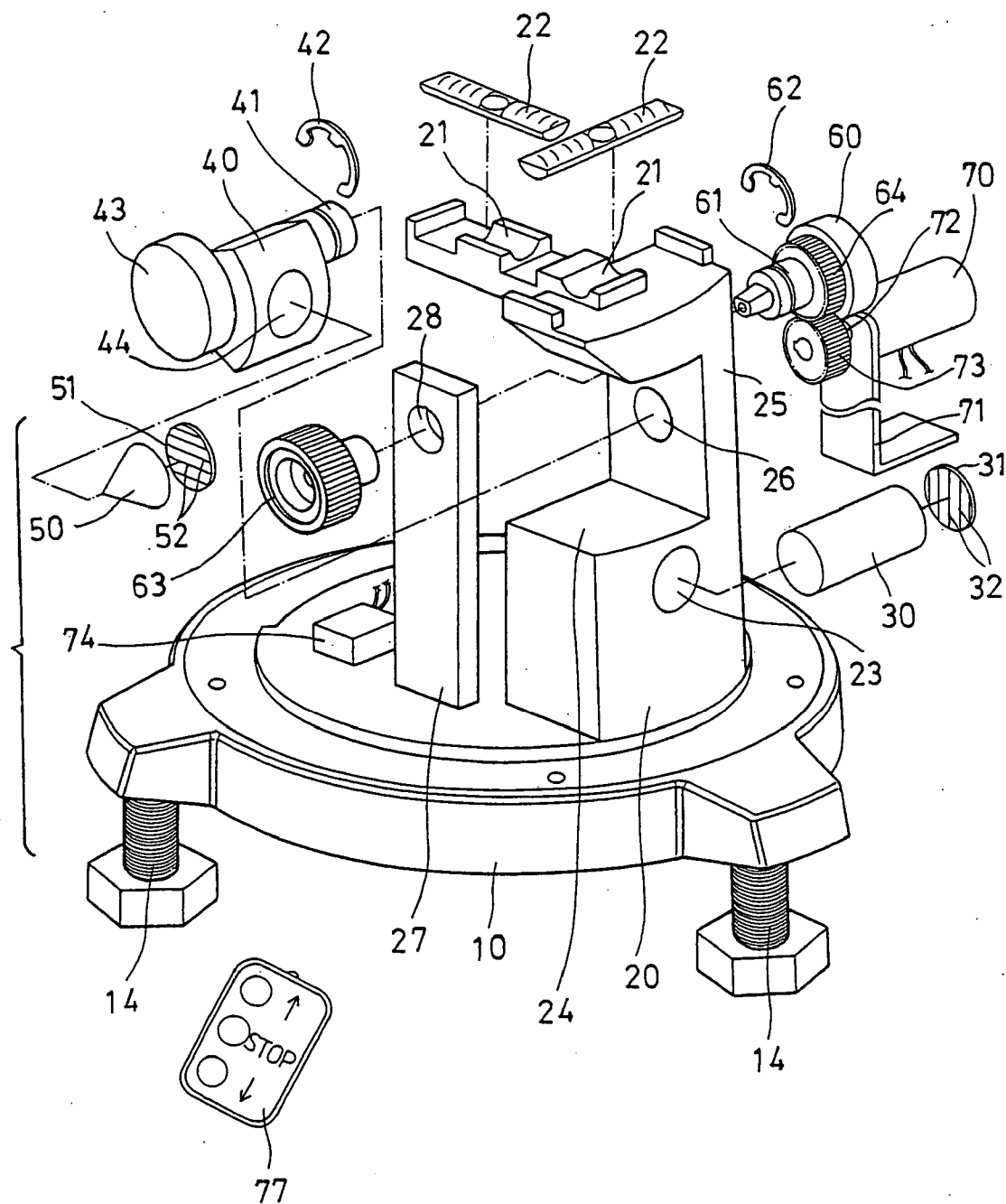


FIG. 2

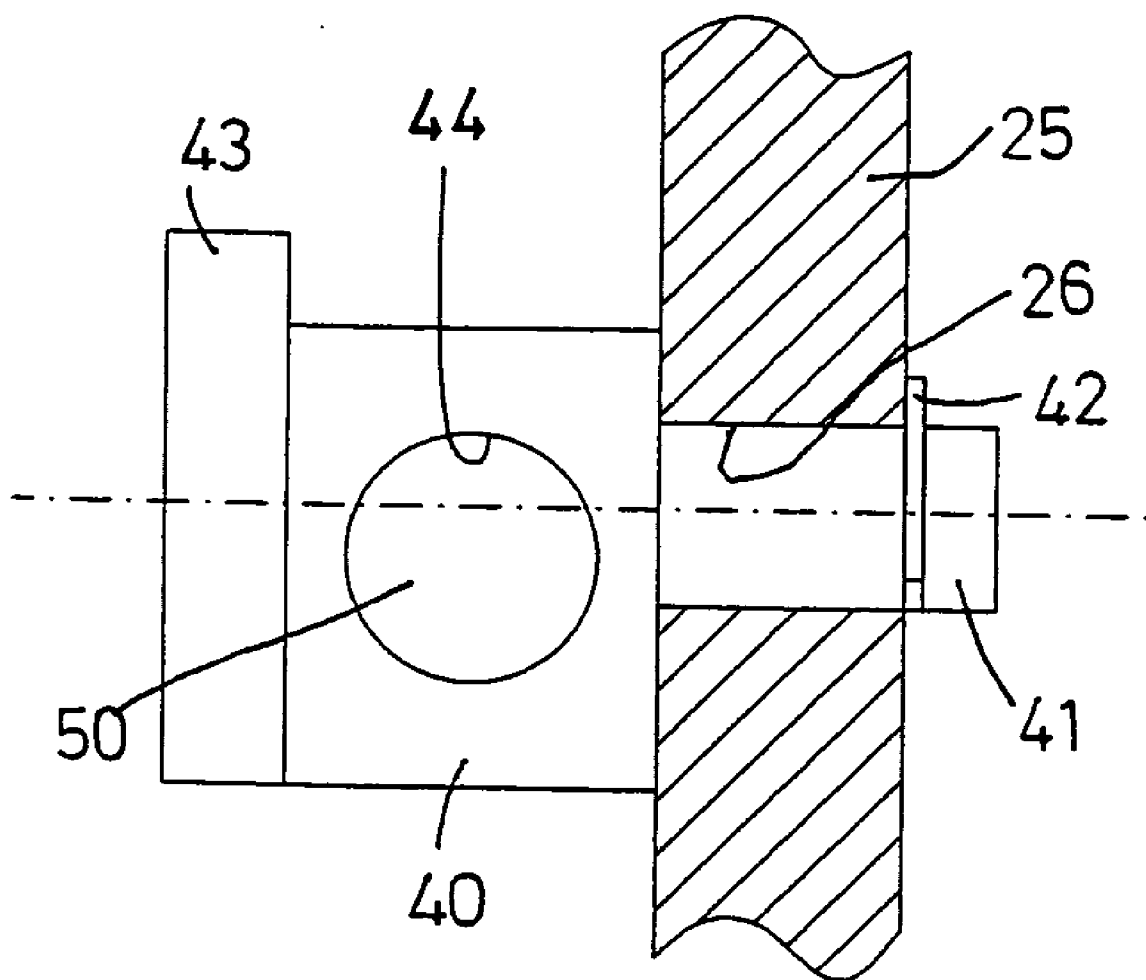


FIG. 3

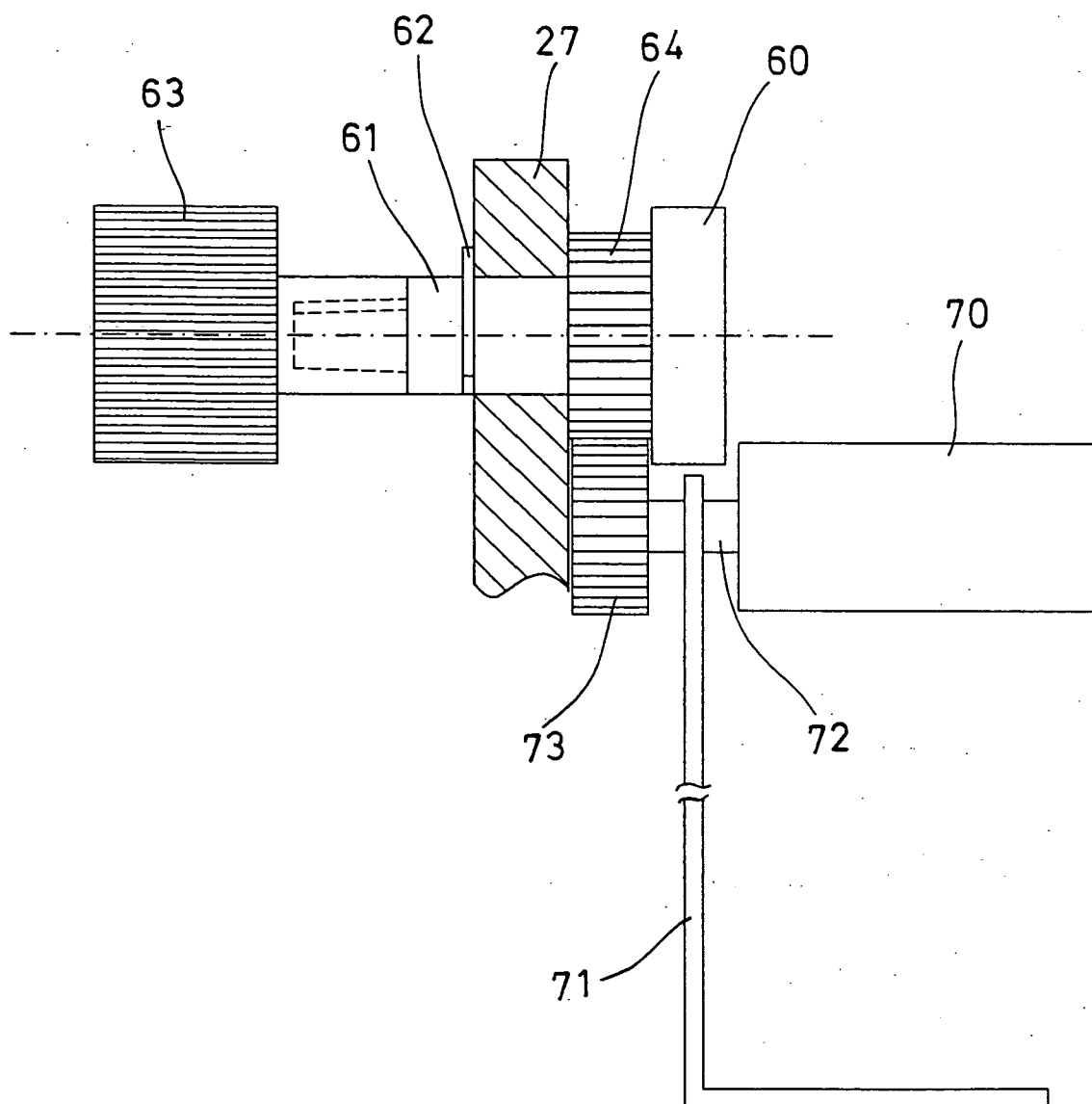


FIG. 4

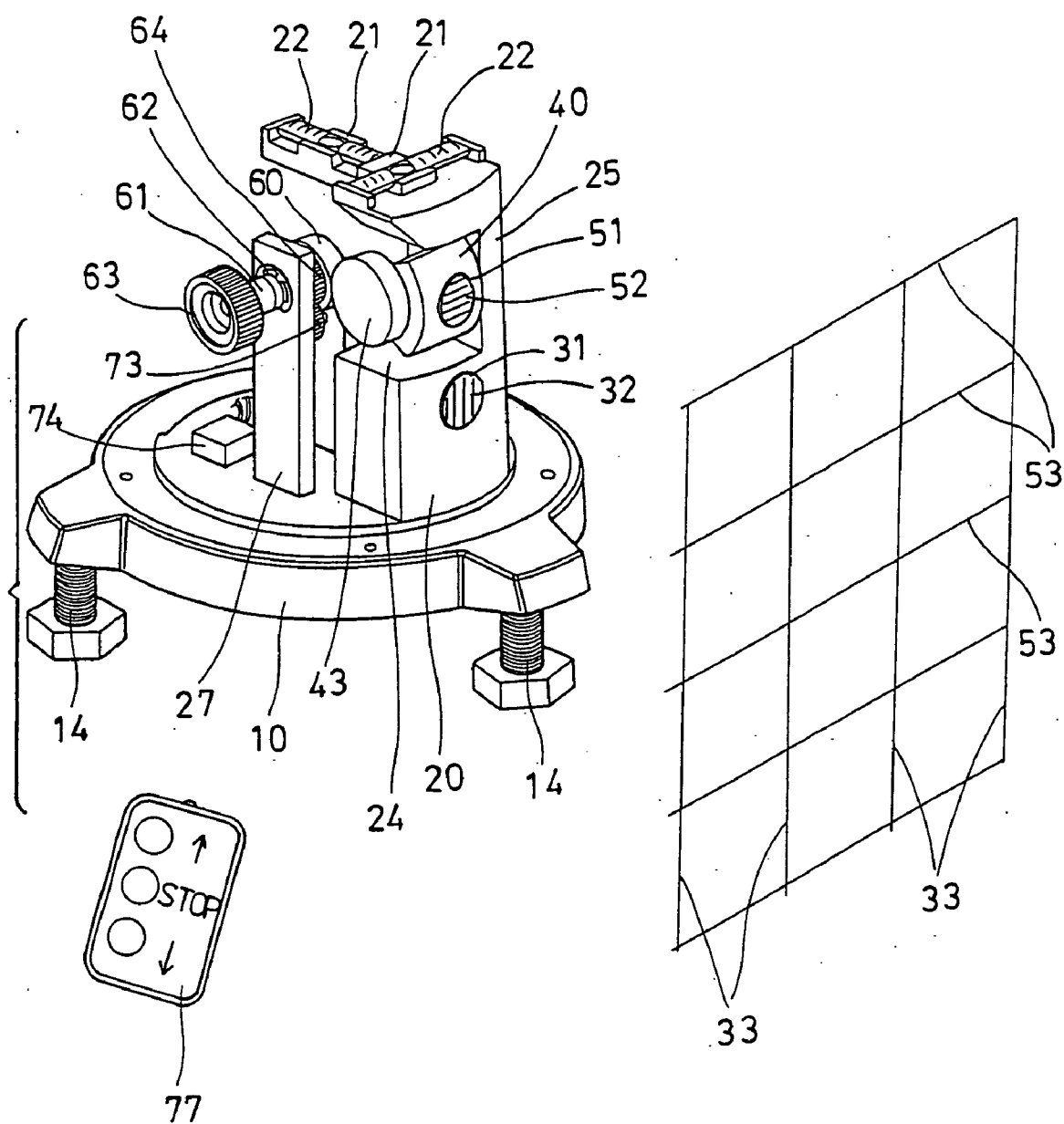


FIG. 5

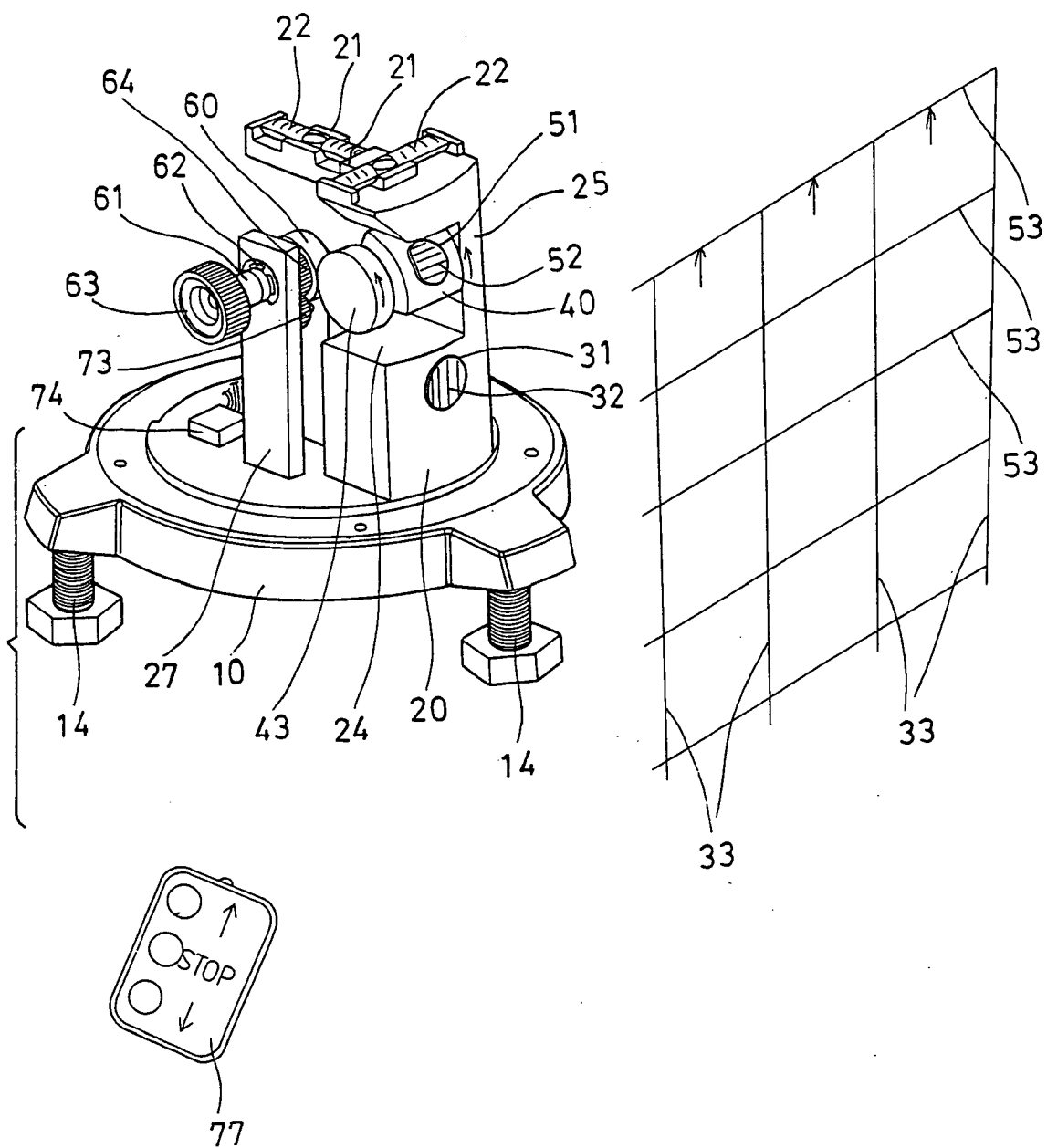


FIG. 6

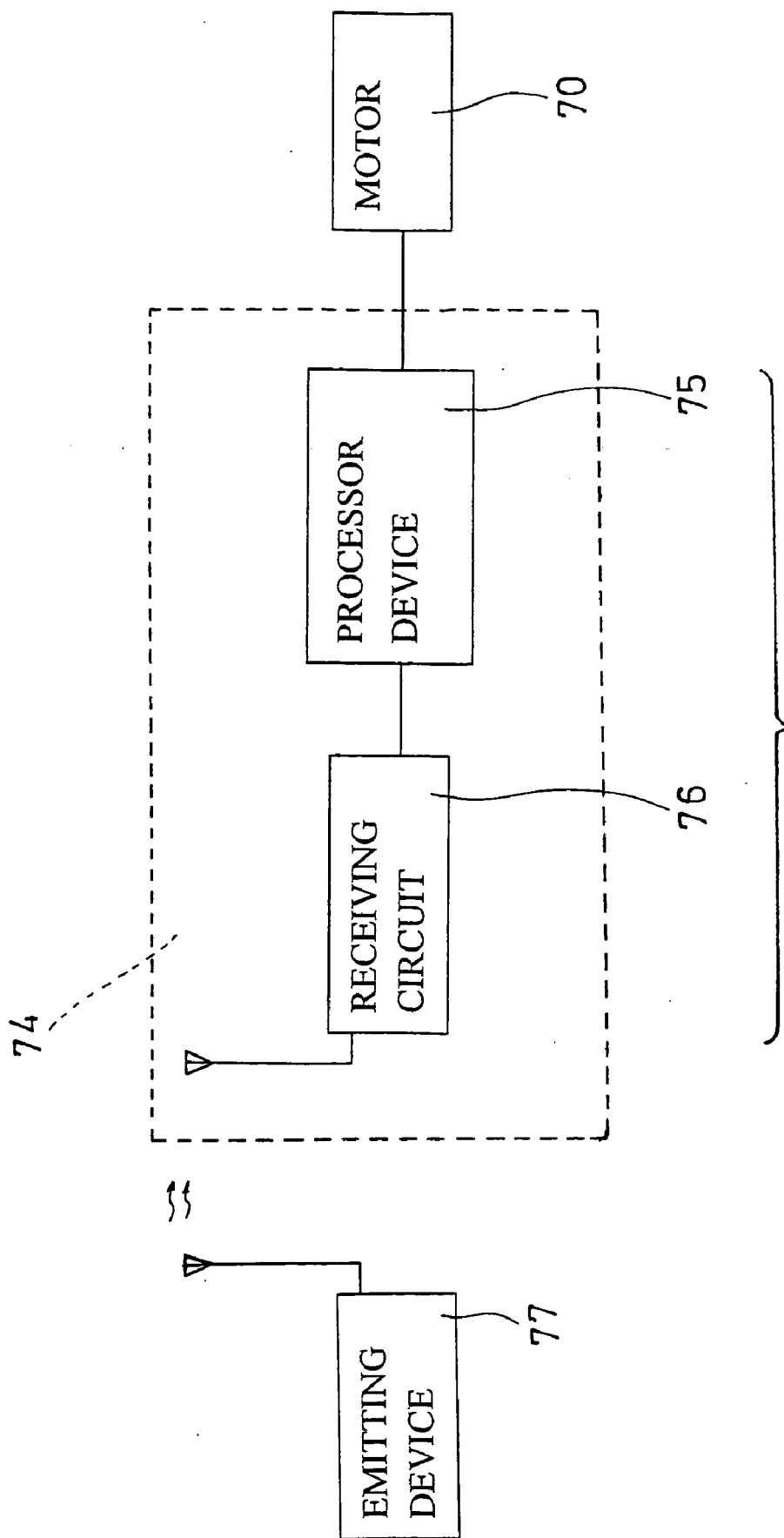


FIG. 7

LIGHT LEVELING DEVICE HAVING REMOTE CONTROL

[0001] The present invention relates to U.S. patent application Ser. No. 10/689,493, filed 17 Oct. 2003, pending.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a laser or light leveling device, and more particularly to a light leveling device including a remote control device to effectively rotate the laser or light instrument.

[0004] 2. Description of the Prior Art

[0005] Various kinds of typical laser or light leveling devices have been developed and comprise one or more laser or light instruments attached thereto for generating one or more light beams or straight lines or reference lines of optical images toward or against wall members, for leveling or plumbing purposes.

[0006] However, the typical laser or light leveling devices are required to be adjusted manually, and may not be controlled or adjusted by motors and/or by remote control devices.

[0007] The present invention has arisen to mitigate and/or obviate the afore-described disadvantages of the conventional laser or light leveling devices.

SUMMARY OF THE INVENTION

[0008] The primary objective of the present invention is to provide a light leveling device including a remote control device to remotely rotate or adjust a laser or light instrument relative to a support base, and to retain the laser or light instrument relative to the support base at the predetermined or required positions or angular positions.

[0009] In accordance with one aspect of the invention, there is provided a light leveling device comprising a housing, a first light instrument attached to the housing, a second light instrument rotatably attached to the housing, to allow the second light instrument to be rotated and adjusted relative to the housing and the first light instrument, and a motor driving device for driving and rotating the second light instrument relative to the housing and the first light instrument.

[0010] The first light instrument includes a lens attached thereto. The lens includes at least one line provided thereon.

[0011] The housing includes a carrier rotatably secured to the housing, and the carrier includes a cavity formed therein to receive the second light instrument therein. The housing includes a chamber formed therein and defined by a fence, to rotatably receive the carrier. The fence includes an aperture formed therein and communicating with the chamber of the housing, the carrier includes a shaft extended therefrom and rotatably engaged through the aperture of the fence, to rotatably secured the carrier to the fence of the housing.

[0012] The motor driving device includes a motor coupled to the carrier, to rotate and adjust the carrier relative to the housing, a first wheel provided on the carrier, and a second wheel engaged with the first wheel to rotate and adjust the

first wheel and the carrier relative to the housing when the second wheel is rotated relative to the first wheel.

[0013] The housing includes a post to rotatably support the second wheel therein. The post includes a bore formed therein, the second wheel includes an axle extended therefrom and rotatably engaged through the bore of the post, to rotatably secure the second wheel to the post. A knob may further be provided and attached to the second wheel to rotate the second wheel relative to the first wheel.

[0014] The motor driving device includes a coupling device for coupling the motor to the second wheel and to drive the second wheel. The second wheel includes an axle, the coupling device includes a first gear attached on the axle, and a second gear attached to the motor and engaged with the first gear.

[0015] A remote control device may further be provided for remotely controlling the motor, and includes a control device coupled to the motor, and an emitting device to emit signals to actuate the control device to remotely operate the motor.

[0016] The second light instrument includes a lens attached thereto. The lens includes at least one line provided thereon. The housing includes at least one seat provided therein, and at least one vial received in the seat of the housing. The housing includes a base having at least one adjusting member attached to bottom thereof.

[0017] Further objectives and advantages of the present invention will become apparent from a careful reading of the detailed description provided hereinbelow, with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 is a partial exploded view of a light leveling device in accordance with the present invention;

[0019] FIG. 2 is another partial exploded view of the light leveling device;

[0020] FIGS. 3, 4 are partial cross sectional views taken along lines 3-3 and 4-4 of FIG. 1 respectively;

[0021] FIGS. 5, 6 are partial exploded views illustrating the operation of the light leveling device; and

[0022] FIG. 7 is a block diagram illustrating the remote control device for the light leveling device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0023] Referring to the drawings, and initially to FIGS. 1 and 2, a light leveling device in accordance with the present invention comprises a base 10, and a supporting housing 20 disposed on the base 10 and including a one or more seats 21 provided thereon for supporting level vials 22 therein. The base 10 includes one or more adjusting members 14, such as adjusting screws 14 attached to the bottom thereof, to adjust the base 10 to a horizontal level or position with the vials 22.

[0024] The housing 20 includes an orifice 23 formed therein for receiving a laser or light instrument 30 received and positioned therein. The laser or light instrument 30 includes a lens 31 attached to the front portion thereof and

having two or more vertical and parallel lines **32** formed or provided therein, for forming or generating vertical and parallel lines **33** (FIGS. 5, 6) on wall members (not shown).

[0025] The housing **20** further includes a notch or a chamber **24** formed therein and defined by a fence **25**, and includes an aperture **26** formed in the fence **25** (FIGS. 2, 3), and communicating with the chamber **24** of the housing **20**. It is preferable that the aperture **26** of the fence **25** is extended in a direction perpendicular to the orifice **23** of the housing **20** and to the laser or light instrument **30**.

[0026] A carrier **40** includes a shaft **41** extended therefrom and rotatably engaged through the aperture **26** of the fence **25**, and rotatably secured to the fence **25** with such as a retaining ring **42**, to allow the carrier **40** to be rotated and adjusted relative to the fence **25** of the housing **20**. The carrier **40** includes a gear or roller or wheel **43** provided thereon, and preferably located opposite or distal to the shaft **41**.

[0027] The carrier **40** further includes a cavity **44** formed therein for receiving another laser or light instrument **50** therein (FIG. 3). The laser or light instrument **50** also includes a lens **51** attached to the front portion thereof and having two or more horizontal and parallel lines **52** formed or provided therein, for forming or generating horizontal and parallel lines **53** (FIGS. 5, 6) on wall members (not shown), and to allow the parallel lines **53** to be perpendicular to the parallel lines **33** generated by the laser or light instrument **30**.

[0028] In operation, the carrier **40** is rotatable or adjustable relative to the housing **20** to adjust and direct the laser or light instrument **50** up and down relative to the housing **20**, in order to adjust the parallel lines **53** up and down relative to the parallel lines **33** that are generated by the laser or light instrument **30**, best shown in FIGS. 5 and 6.

[0029] The base **10** or the housing **20** further includes a post **27** extended from such as the base **10**, and having a bore **28** formed therein. Another gear or roller or wheel **60** includes an axle **61** extended therefrom and rotatably engaged through the bore **28** of the post **27** or of the housing **20** (FIG. 4), and rotatably secured to the post **27** or the housing **20** with such as a retaining ring **62**, to allow the wheel **60** to be rotated and adjusted relative to the post **27** or the housing **20**.

[0030] The wheel **60** is engaged with the wheel **43** of the carrier **40** (FIG. 1) with such as a gear-engagement, or a force-fitted engagement, to allow the wheel **43** and thus the carrier **40** to be rotated or adjusted relative to the post **27** or the housing **20** by the wheel **60**. A knob **63** may be secured to the wheel **60** or to the axle **61** of the wheel **60** to rotate and adjust the wheel **60** and thus the wheel **43** and the carrier **40** and the laser or light instrument **50** relative to the housing **20** and the laser or light instrument **30**.

[0031] It is preferable that either or both of the wheels **43**, **60** are made of rubber or coarse materials, to allow the wheels **43**, **60** to be solidly contacted and engaged with each other, and to allow the wheel **43** to be solidly and effectively rotated by the other wheel **60**. The laser or light instrument **50** may thus be effectively rotated or adjusted relative to the housing **20** and the laser or light instrument **30** by the wheel **60** and/or the knob **63**.

[0032] The housing **20** and the post **27** and the base **10** may be formed as a support member for supporting the laser or light instruments **30**, **50** and the carrier **40** and the wheel **60**. The light instrument **50** and the carrier **40** may be rotated or adjusted relative to the housing **20** and the laser or light instrument **30** to any angular position simply by the wheel **43**, or by the knob **63** and the other wheel **60**.

[0033] In operation, as shown in FIG. 5, the lights or lines **33** generated by the light instrument **30** may be emitted onto and retained on the wall members. As shown in FIG. 6, the carrier **40** may be rotated or adjusted relative to the housing **20** and the laser or light instrument **30** to any angular position by the knob **63** and the engagement between the wheels **43**, **60**.

[0034] It is to be noted that the base **10** and the housing **20** may also be attached to a vertical wall (not shown) to have the parallel lines **33** generated by the laser or light instrument **30** to be arranged horizontally, and the parallel lines **53** generated by the laser or light instrument **50** to be arranged vertically and perpendicular to the horizontal lines **33**.

[0035] A driving device **70**, such as a motor **70** may further be provided to drive or rotate or adjust the carrier **40** relative to the fence **25** of the housing **20**. For example, a roller or wheel or gear **64** may be provided and attached to the carrier **40**, or to the axle **61** of the wheel **60**. The driving device **70** or the motor **70** may be attached to the post **27** of the housing **20** or of the base **10** with such as a bracket **71**, and includes a spindle **72** having another roller or wheel or gear **73** attached thereto and engaged with the gear **64** of the axle **61** or of the wheel **60** (FIG. 4).

[0036] As shown in FIG. 7, a control device **74** may be provided to control or to operate the motor **70**, and includes a processor device **75** coupled to the motor **70**, in order to control or operate the motor **70**, and includes a signal receiving circuit **76** coupled to the processor device **75**, for signal receiving purposes. The control device **74** further includes a signal controlling or emitting device **77** for emitting control signals to the signal receiving circuit **76**, in order to control or operate the motor **70** via the processor device **75**.

[0037] In operation, the carrier **40** may be automatically rotated or adjusted relative to the housing **20** and the laser or light instrument **30** to any angular position by the motor **70** via the wheels **43**, **60** and the gears **64**, **73**. In addition, the motor **70** may be actuated or operated or controlled remotely by the control device **74**.

[0038] It is to be noted that the gear **73** of the motor **70** may also be directly coupled to or engaged with the wheel **43** of the carrier **40**, in order to directly rotate or control or adjust the carrier **40** relative to the housing **20** or the base **10**.

[0039] Accordingly, the light leveling device in accordance with the present invention includes a rotatable laser or light instrument rotatable or adjustable relative to the support housing automatically by the motor, and/or remotely by the control device, for facilitating the leveling or plumbing purposes thereof.

[0040] Although this invention has been described with a certain degree of particularity, it is to be understood that the present disclosure has been made by way of example only and that numerous changes in the detailed construction and

the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.

1. A light leveling device comprising:

a housing including a carrier rotatably secured thereto and having a cavity formed therein,

a first light instrument attached to said housing,

a second light instrument received in said cavity of said carrier for being rotatably attached to said housing, to allow said second light instrument to be rotated and adjusted relative to said housing and said first light instrument, and

motor driving means for driving and rotating said second light instrument relative to said housing and said first light instrument, said motor driving means including a first wheel provided on said carrier, a second wheel engaged with said first wheel to rotate and adjust said first wheel and said carrier relative to said housing when said second wheel is rotated relative to said first wheel, said second wheel including an axle, a first gear attached on said axle, a motor, and a second gear attached to said motor and engaged with said first gear, for coupling said motor to said second wheel and to drive said second wheel and said first wheel and said carrier relative to said housing.

2. The light leveling device as claimed in claim 1, wherein said first light instrument includes a lens attached thereto.

3. The light leveling device as claimed in claim 2, wherein said lens includes at least one line provided thereon.

4. (canceled)

5. The light leveling device as claimed in claim 1, wherein said housing includes a chamber formed therein and defined by a fence, to rotatably receive said carrier.

6. The light leveling device as claimed in claim 5, wherein said fence includes an aperture formed therein and commu-

nicating with said chamber of said housing, said carrier includes a shaft extended therefrom and rotatably engaged through said aperture of said fence, to rotatably secured said carrier to said fence of said housing.

7-8. (canceled)

9. The light leveling device as claimed in claim 1, wherein said housing includes a post to rotatably support said second wheel therein.

10. The light leveling device as claimed in claim 9, wherein said post includes a bore formed therein, said second wheel includes an axle extended therefrom and rotatably engaged through said bore of said post, to rotatably secure said second wheel to said post.

11. The light leveling device as claimed in claim 1 further comprising a knob attached to said second wheel to rotate said second wheel relative to said first wheel.

12-13. (canceled)

14. The light leveling device as claimed in claim 1 further comprising a remote control means for remotely controlling said motor.

15. The light leveling device as claimed in claim 14, wherein said remote control means includes a control device coupled to said motor, and an emitting device to emit signals to actuate said control device to remotely operate said motor.

16. The light leveling device as claimed in claim 1, wherein said second light instrument includes a lens attached thereto.

17. The light leveling device as claimed in claim 16, wherein said lens includes at least one line provided thereon.

18. The light leveling device as claimed in claim 1, wherein said housing includes at least one seat provided therein, and at least one vial received in said at least one seat of said housing.

19. The light leveling device as claimed in claim 1, wherein said housing includes a base having at least one adjusting member attached to bottom thereof.

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