ROULETTE WHEEL WITH LEVELING CORRECTION AND GAMING TABLE INCLUDING THIS KIND OF ROULETTE WHEEL

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Abstract: Roulette wheel including a bowl, a disk rotatably mounted inside the bowl, and an assembly for adjusting the leveling of the bowl. The adjustment includes an inclination detector attached to the bowl (1) and actuators for automatically correcting the leveling of the bowl as a function of information supplied by the inclination detector. This roulette wheel with leveling correction is placed on the playing surface of a roulette table.
ROULETTE WHEEL WITH LEVELING CORRECTION AND GAMING TABLE INCLUDING THIS KIND OF ROULETTE WHEEL

CROSS REFERENCE TO RELATED APPLICATIONS


BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention
[0003] The present invention relates to a roulette wheel and to a gaming table carrying this kind of wheel.
[0004] 2. Discussion of Background Information
[0005] An essential element of French or American roulette is the roulette wheel, as is known in the art.
[0006] This kind of wheel conventionally comprises a bowl, generally of wood, within which is rotatably mounted a disk, generally of metal.
[0007] Numbers are marked at the periphery of this disk, and compartments separated from each other by dividing walls are disposed radially inside and facing the numbers.
[0008] In use, the disk is rotated manually by a knob at its center and a ball is launched onto the upper track of the bowl.
[0009] The ball runs around this track, moves onto the rotating disk, and finally settles in one of the compartments of the disk, thereby designating a number at random.
[0010] For the disk to be able to rotate correctly relative to the bowl and for the trajectory of the ball not to be influenced in any way by any slope whatsoever, it is essential that the bowl can be leveled so that it is perfectly horizontal.
[0011] To achieve this result, the bowl is conventionally mounted on feet with thumbwheels that can be adjusted manually from time to time. A spirit level is used to check that the wheel is horizontal; if necessary, the feet are adjusted to return the wheel to the horizontal.
[0012] These periodic adjustments necessitate great care and take a long time.
[0013] There is therefore a need for a system for leveling a roulette wheel quickly and with great accuracy.

SUMMARY OF THE INVENTION

[0014] The present invention relates to a roulette wheel comprising a bowl, a disk rotatably mounted inside the bowl, and an adjustment assembly for adjusting the leveling of the bowl. The adjustment assembly comprises an inclination detector attached to the bowl and an automatic correction assembly for automatically correcting the leveling of the bowl as a function of information supplied by the inclination detector.
[0015] The inclination detector allows the actual leveling of the bowl of the roulette wheel to be determined continuously and corrected immediately and with great accuracy by the automatic correction assembly.
[0016] According to one aspect of the invention, the inclination detector comprises a two-axis inclinometer.
[0017] An inclinometer of this kind is commercially available in the form of an integrated circuit and provides the leveling correction function compactly and at low cost.
[0018] According to another aspect of the invention, the automatic correction assembly comprises a tripod stand supporting the bowl, in which at least two of the three feet of the stand incorporate an actuator adapted to vary the effective length of the corresponding foot.
[0019] According to a further aspect of the invention, the automatic correction assembly comprises two actuators under the bowl, each adapted to pivot the bowl about an axis passing through the other actuator and through a bearing point under the bowl. The automatic correction assembly further comprises a control unit for controlling the actuators as a function of information supplied by the inclination detector.
[0020] Two actuators are sufficient to modify the leveling of the roulette wheel in all directions in space and enable simple and economical leveling correction.
[0021] According to another aspect of the invention, the actuators are of the linear electromechanical type.
[0022] Linear actuators are readily available commercially and can execute adjustments of great accuracy.
[0023] According to a further aspect of the invention, the control unit comprises a storage device for storing information supplied by the inclination detector corresponding to a calibration leveling of the bowl and for automatically moving the bowl from any leveling to the calibration leveling.
[0024] The storage device for storing a calibration leveling enables information supplied by the inclinometer corresponding to the ideal leveling of the roulette wheel to be stored in memory and the actuators subsequently controlled to cause information currently supplied by the inclinometer to converge toward the information stored in memory.
[0025] Accordingly, once the calibration has been effected, the current leveling of the roulette wheel may be changed to its ideal leveling at any time.
[0026] According to another aspect of the invention, the roulette wheel comprises a warning device for warning that it is impossible to correct the leveling given the information supplied by the inclinometer and the actual positions of the actuators.
[0027] The warning device advises the operator when the system of the invention is insufficient to achieve automatic leveling correction, and therefore that manual intervention is necessary.
[0028] According to a further aspect of the invention, the inclinometer and/or the actuators are mounted inside open housings under the bowl.
[0029] Placing the inclinometer and the actuators inside the bowl of the roulette wheel provides that the outline of the wheel is not increased so that it is not necessary to modify roulette tables to be equipped with this kind of wheel.
[0030] The present invention also relates to a spirit level for calibrating the above roulette wheel, the spirit level comprising a window containing a bubble mounted on a supporting structure with three bearing points adapted to rest on the upper track of the bowl of the roulette wheel.
[0031] The present invention further relates to a roulette gaming table that it carries the above roulette wheel.
BRIEF DESCRIPTION OF THE DRAWINGS

[0032] Features and advantages of the present invention will become apparent in the light of the following description with reference to the appended drawings of one embodiment of a roulette wheel of the invention, provided by way of non-limiting example, in which drawings:

[0033] FIG. 1 is a perspective view of a roulette wheel of the invention,
[0034] FIG. 2 is a view of this roulette wheel in section taken along the line A-A in FIG. 4,
[0035] FIG. 3 is a plan view of part of FIG. 2,
[0036] FIG. 4 is a diagrammatic bottom view of the roulette wheel of the invention, and
[0037] FIG. 5 is a diagrammatic top view of the roulette wheel of the invention during calibration.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0038] Referring to FIGS. 1 and 2, it is seen that the roulette wheel of the invention comprises a bowl 1, preferably made of hardwood or synthetic material. Inside the bowl 1 is rotatably mounted a disk 5, preferably and conventionally formed of a plurality of metal parts assembled together.

[0039] A tank 3, preferably made of metal, is fixed to the bowl 1 and serves as a housing for the disk 5, which is rotatably mounted by ball bearings on a spindle 7. The spindle 7 is fixed to the bottom of the tank 3.

[0040] A knob 9 is fastened to the disk 5.

[0041] The disk 5 has numbers 11 at its periphery and, radially inside and facing the numbers, compartments 13 separated from each other by frets 15. This is known in the art.

[0042] Referring to FIGS. 2 to 4, it can be seen that the bowl 1 of the roulette wheel of the invention comprises three housings opening onto its lower face.

[0043] Two of these housings contain actuators 17a, 17b and the third housing contains a two-axis inclinometer 19.

[0044] The bowl 1 has a bearing member 21 on its lower external face.

[0045] As may be seen in FIG. 4, the two actuators 17a, 17b and the bearing member 21 are preferably disposed substantially at the three vertices of an equilateral triangle centered relative to the bowl 1. The inclinometer 19 may be disposed in the vicinity of the bearing member 21, on the median line of the segment delimited by the two actuators.

[0046] The two actuators 17a, 17b are preferably linear electromechanical actuators from HAYDON SWITCH & INSTRUMENT INC., Waterbury, Conn. 06705 USA.

[0047] For a conventional roulette wheel weighing from 70 kg to 120 kg, the two actuators are rated to be able to exert a thrust of the order of 80 kg over a stroke of the order of 13 mm.

[0048] The two-axis inclinometer 19 may be an SCA100T integrated circuit from VTI TECHNOLOGIES, Dearborn, Mich. 48126, USA.

[0049] An inclinometer of the above kind is capable of detecting an inclination angle variation of the order of 0.1 degree about two perpendicular directions symbolized by two arrows 23 (see FIG. 3) on the top of the integrated circuit.

[0050] The two actuators 17a, 17b and the inclinometer 19 are connected by appropriate electrical connections 25a, 25b, 25c to an electronic control unit 27 that may comprise an electrical power supply, calculation unit, and a memory area 29.

[0051] The control unit 27 is preferably situated externally to the roulette wheel, but may be integrated into the bowl 1.

[0052] The mode of operation and the advantages of the invention follow directly from the preceding description.

[0053] The roulette wheel is designed to be placed on the playing surface 31 of a gaming table 33 shown diagrammatically in partial section in FIG. 2.

[0054] A preliminary operation includes calibrating the automatic correction assembly.

[0055] This operation may be carried out either on the gaming table 33 or elsewhere, for example, on a support other than the gaming table in which the roulette wheel is to be installed.

[0056] The first step is to place a spirit level with three bearing points, for example, a tripod spirit level 36, so that its three feet 37a, 37b, 37c bear on the upper track 38 of the bowl 1, in the manner shown in FIG. 5.

[0057] The leveling of the bowl 1 is then adjusted manually until the bubble 39 of the tripod spirit level 36 is exactly in the middle of the observation window 40 of the tripod, thereby indicating that the leveling of the bowl 1 is perfectly horizontal.

[0058] The leveling of the bowl 1 may be manually adjusted in any appropriate manner, for example, by placing shims under the bowl or by adjusting the height of the feet of the support on which the bowl is placed (gaming table or other support).

[0059] Once the leveling of the bowl 1 has been adjusted in this way, the control unit 27 is operated (for example, by way of a calibration button) to store the information supplied by the inclinometer 19 corresponding to this leveling in the memory area 29.

[0060] The tripod 36 may then be removed, any manual adjustment devices (shims, support with adjustable feet, etc.) cleared away, and the roulette wheel 1 positioned as shown in FIG. 2 (i.e., so that the bearing member 21 and the rods 35 of each of the actuators 17a, 17b bear on the upper face of the playing surface 31 of the gaming table 30).

[0061] The control unit 27 is then operated (for example, by way of an appropriate control button) so that it commands adjustment of the lengths of the rods 35 of the two actuators 17a, 17b until the information currently supplied by the two-axis inclinometer 19 coincides with the stored information corresponding to the horizontal leveling determined beforehand, in the manner described above.

[0062] Two actuators are generally sufficient, each actuator being able to pivot the bowl about an axis passing through the other actuator and through the bearing point 21, which provides that the leveling of the bowl 1 can be modified in all directions in space. However, the bearing member 21 may alternatively be replaced by a third linear electromechanical actuator of the same type as the actuators 17a and 17b.
Without departing from the scope of the present invention, the roulette wheel could rest on a tripod base, at least two of the three feet whereof, or even all three feet, incorporating an actuator adapted to vary its effective length.

A warning device may be provided, for example, an audible warning device, to advise the operator that it is impossible to correct automatically the leveling of the bowl 1 given the information supplied by the inclinometer 19 and the actual positions of the actuators 17a, 17b.

The warning device may be triggered if the stroke of the rods 35 of the actuators 17a, 17b is insufficient to achieve a horizontal leveling.

Other warning devices may also be provided to advise the operator that automatic correction of the leveling of the bowl 1 is in progress.

Automatic correction of the leveling of the bowl may be triggered at the command of an operator, as indicated above, or in a programmed periodic manner.

Triggering may also occur automatically each time that the leveling measured by the inclinometer 19 departs by a predetermined amount from the ideal leveling determined in the manner indicated above.

The present invention is not limited to the embodiment described and shown, which is provided by way of illustrative and non-limiting example.

For example, two single-axis inclinometers could be used instead of a two-axis inclinometer.

1. A roulette wheel, comprising:
   a bowl;
   an adjustment assembly for adjusting the leveling of the bowl comprising an inclination detector attached to the bowl, and an automatic correction assembly for correcting the leveling of the bowl as a function of information supplied by the inclination detector.

2. The roulette wheel according to claim 1, wherein the inclination detector comprises a two-axis inclinometer.

3. The roulette wheel according to claim 1, wherein the automatic correction assembly comprises a tripod stand having three feet to support the bowl; and
   at least two of the feet comprise an actuator structured and arranged to vary an effective length of the corresponding foot.

4. The roulette wheel according to claim 1, wherein the automatic correction assembly comprises:
   two actuators disposed under the bowl, in which each actuator is structured and arranged to pivot the bowl about an axis that passes through the other actuator and through a bearing point under the bowl; and
   a control unit that controls the actuators as a function of information supplied by the inclination detector.

5. The roulette wheel according to claim 1, wherein the actuators comprise linear electromechanical actuators.

6. The roulette wheel according to claim 1, wherein the control unit comprises a storage device for storing information supplied by the inclination detector corresponding to a calibration leveling of the bowl and for automatically moving the bowl from any leveling to the calibration leveling.

7. The roulette wheel according to claim 1, further comprising:
   a warning device for warning that, given the information supplied by the inclination device and positions of the actuators, the leveling of the bowl cannot be corrected.

8. The roulette wheel according to claim 1, wherein the two-axis inclinometer is mounted inside an open housing under the bowl.

9. The roulette wheel according to claim 1, wherein the actuators are mounted inside open housings under the bowl.

10. A spirit level for calibrating the roulette wheel according to claim 1, the spirit level comprising:
   a supporting structure with three bearing points structured and arranged to rest on an upper track of the bowl of the roulette wheel; and
   a window containing a bubble mounted on the supporting structure.

11. A roulette gaming table structured and arranged to carry the roulette wheel according to claim 11.

12. The roulette wheel according to claim 11, wherein the automatic correction assembly comprises linear electromechanical actuators.

13. The roulette wheel according to claim 11, wherein the automatic correction assembly comprises a storage device for storing information supplied by the inclination detector corresponding to a calibration leveling of the bowl and for automatically moving the bowl from any leveling to the calibration leveling.

14. The roulette wheel according to claim 11, further comprising:
   a warning device for warning that the leveling of the bowl cannot be corrected given the information supplied by the inclination device and the automatic correction assembly.

15. A method for automatically leveling a roulette wheel, comprising:
   monitoring an inclination of the roulette wheel relative to a calibrated leveling; and
   automatically controlling the inclination of the roulette wheel.

16. The method according to claim 15, further comprising predetermining the calibrated leveling and storing the calibrated leveling.

17. The method according to claim 16, further comprising comparing the stored calibrated leveling to the monitored inclination, and, when the monitored inclination departs from the stored calibrated leveling by a predetermined amount, controlling actuators to adjust the inclination.

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