POGO DEVICE

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Abstract
A more stable pogo stick device, which may or may not be steerable, employs multiple spring legs, at least one of which can have an alterable spring rate. To steer in a direction, the alterable spring rate is employed, whereupon the pogo will move in the direction of the softer spring. Further, a pogo stick with enhanced stability and safety is provided by employing multiple, vertical springing legs. A pogo with enhanced stability and widened foot platform provides the ability for a single rider to perform tricks and/or to allow multiple riders to jump together at the same time.
POGO DEVICE

BACKGROUND OF THE INVENTION

[0001] This invention relates to pogo sticks, and more particularly to a steerable pogo stick device with improved stability and to a pogo stick device that has greater stability and allows.

[0002] Pogo sticks have been popular on and off over the years. However, several things may have slowed the rate of use of pogo sticks. First, it takes some practice to be skillful enough to ride for more than a short period. The user must have good balance skills to successfully mount and ride the device. Further, it can be difficult to control the direction of travel. Still further, the narrow foot supports on a typical pogo stick require that the user wear shoes with sturdy soles. Barefoot use or use while wearing sandals or flip flop type footwear can be painful, as the user's entire weight is supported in the arch of the foot. Long periods of use, even with sturdy shoes, can be tiring to the bottom of the foot. Finally, traditional pogo are limited to one rider.

SUMMARY OF THE INVENTION

[0003] In accordance with the invention, a steerable pogo stick is provided. The pogo stick includes at least one rebounding member for which the rebound rate may be varied by the user, to enable steering of the pogo device.

[0004] Accordingly, it is an object of the present invention to provide an improved pogo stick that is steerable.

[0005] It is a further object of the present invention to provide an improved pogo stick that provides a stable configuration.

[0006] It is another object of the present invention to provide a pogo stick that is not unduly painful to the user's foot.

[0007] It is yet another object of the present invention to provide an improved steerable pogo stick adapted for easy use by less skilled riders.

[0008] It is a further object of the present invention to provide a stable large platform pogo stick adapted for use by two or more riders at the same time.

[0009] The subject matter of the present invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. However, both the organization and method of operation, together with further advantages and objects thereof, may best be understood by reference to the following description taken in connection with accompanying drawings wherein like reference characters refer to like elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a perspective view of a steerable pogo stick according to an embodiment of the invention;

[0011] FIG. 2 is a sectional view taken along line 2-2 of FIG. 1 illustrating the configuration of the “steerable” leg of FIG. 1;

[0012] FIG. 3 is a sectional view taken along line 3-3 of FIG. 1 illustrating the configuration of the “non-steerable” leg of FIG. 1;

[0013] FIG. 4 is an enlarged partial perspective view of the steerable leg, illustrating operational aspects thereof;

[0014] FIG. 5 is a diagram of a pneumatic system in accordance with a pogo using pneumatic springs; and

[0015] FIG. 6 is a perspective view of a multiple rider pogo according to the invention.

DETAILED DESCRIPTION

[0016] The system according to a preferred embodiment of the present invention comprises a pogo stick having three leg members which are positioned a distance away from the center of the pogo stick. One of the legs has adjustable spring rate to provide steerability to the pogo stick.

[0017] Referring to FIG. 1, which is a perspective view of a steerable pogo stick device 10 according to an embodiment of the invention, the device comprises a base region 12 having 3 base arms 14, 16 and 18 extending radially outwardly therefrom. The three base arms are suitably evenly spaced, any two adjacent arms being at an angle a apart, suitably 120 degrees. Arm 14 is denoted the front arm in the embodiment of FIG. 1, and carries an upwardly extending steerable leg 20 near the end of the arm distal from the center of the device. The other two arms 16 and 18 carry upwardly extending non-steerable legs 22, 22 near the respective ends of the arms distal from the center of the device.

[0018] Mounted to the top of the base region 12 is a foot plate 24 positioned over the central portion of the base and extending somewhat more out the front arm than out the other two arms. A handle bar 28 is attached to a base shaft member 26, the base shaft member extending upwardly from the base at a position slightly forward of the center of the base along the front arm 14. The foot plate is laterally centered relative to the base shaft member.

[0019] The handle bar 28 may carry an actuable release handle 30 thereon and may be rotatable about its longitudinal axis 32 as illustrated. The release handle 30 or the rotational portion of the handle bar is operatively associated with a release member 34 to provide steering capability as described hereinbelow.

[0020] Referring now to FIG. 2, a sectional view taken along line 2-2 of FIG. 1 illustrating the configuration of the “steerable” leg 20, the leg comprise a hollow leg tube 36, the top being closed by an upper cap member 34. An upper elongate spring 38 is positioned in the top end of the leg tube interior around a spring retention shaft 40. A latch member housing 42 carries components therewith that engage a piston 44 as described in FIG. 4, the upper end of piston 44 being engaged by the bottom of spring 38.

[0021] A spacer 46 in the piston is provided and is engaged at its bottom end by a middle spring 48, the opposite end of the middle spring resting on upper shaft bushing 50. Bushing 50 receives leg shaft 52 through the center thereof. The bottom of bushing 50 is engaged by lower spring member 54, the opposing end of the spring 54 contacts the top of lower guide bushing 56 which extends out of the bottom of the leg tube. Leg shaft 52 extends beyond the leg tube, and carries an exterior spring 57 therearound. The bottom of the leg shaft attaches to a foot member 58, which includes elastomeric or rubber member 60 on the bottom thereof. A
flange 55 is provided on the exterior of the leg tube, at a position corresponding to almost the midpoint of the spring 54, to enable mounting of the leg to the arm 14. [0022] FIG. 3 is a sectional view taken along line 3-3 of FIG. 1 illustrating the configuration of the “non-steerable” leg of FIG. 1. It will be noted that the configuration of the non-steerable leg corresponds to the configuration of the steerable leg, without the upper spring 38, the retention shaft 40 and the latch member housing 42 and its components. Accordingly, the description of the correspondingly numbered items is as with those items in FIG. 2. However, for example, leg tube 36 is shorter than leg tube 36, since it does not carry an upper spring 38 therewithin. [0023] Referring now to FIG. 4, an enlarged partial perspective view of the steerable leg, illustrating operational aspects thereof, the piston 44 has a circumferential groove 62 defined near the upper end thereof. Latch member housing 42 has defined therewithin a pivotally mounted engaging member 64 that includes an end pin 66 cooperatively engages with the groove 62 of the piston. The engaging member 64 is connected to a lever 70 which pivots on pivot pin 72. A biasing member such as spring 68 urges the engaging member in the direction of arrow 76. The end of lever 70 distal from the pivot point is connected to an extension spring 63 which allows the cable to be extended even when load on the latch 66 prevents release, which is attached to a first end of a release cable 78, the cable extending downward and eventually feeding back up to the area of handle bar 28, suitably operatively connecting to release handle 30. [0024] In operation, a user clamps onto the device, placing the left and right feet onto the foot plate 24, suitably with the base member 26 positioned between the two feet. The front of the user’s foot is to be pointed towards the front leg 20. As the user jumps up and down, the springs in the legs will operate to provide the up and down bouncing action that is normally associated with a pogo stick. This bouncing action is accomplished by springs 48, 54 and 57 of the front leg and springs 48, 54 and 57 of the rear legs. Spring 38 is not operating at this point, as piston 44 will not move, resulting from the engagement between the circumferential groove 62 of the piston with pin 66 of engagement member 64. [0025] If the user wishes to move the pogo in a forward direction, by operating the release handle 30, cable 78 is pulled, which results in the downward movement of the leftmost end of lever 70 in the view of FIG. 4. The movement of the lever pivots end pin 66 of engaging member 64 out of its engagement with circumferential groove 62, which frees piston 44 to move within the leg tube. Now, on a downward bounce of the pogo device, spring 38 becomes part of the overall spring system in the front leg, and springs 38, 48, 54 and 57 are all compressible on the down stroke. This addition of the extra spring makes a much softer action for the front leg, and allows the pogo device to cant in the direction of the forward leg, which will result in a forward motion of the pogo device. [0026] When the user lets go of the release handle, spring 68 will urge the engagement arm in the direction of arrow 76 of FIG. 4. The engagement arm will then move back toward the piston, and the pin 66 will reengage with the circumferential groove 62 in the piston, thereby again removing spring 38 from the system of springs. If at the time the user lets go of the release handle, pin 66 is not aligned with the groove 62, the pin will merely slide along the wider portion of the piston as the piston moves within the leg, until such time as the alignment occurs. [0027] In another embodiment, all three legs are steerable legs. To move forward, the front leg is actuated to create a lower spring rate and cant the pogo in that direction. To move left, the front leg and left leg are simultaneously actuated to cause the pogo to cant forward and left. To move right, the forward and right pogo are actuated. In one approach for actuating steering of forward, left, or right, the handlebar can twist for forward and cant left to go left and cant right to go right. These actions cause the appropriate cables to actuate in combinations to produce the desired direction. [0028] While the illustrated preferred embodiment employs coil springs in the legs, an alternate embodiment uses pneumatic action legs. In the pneumatic embodiment, instead of use of an additional spring with a releasable piston to engage and disengage the spring, an additional pneumatic reservoir chamber is provided. Then, on actuation of the control by the user, the additional chamber is included in the system, for example by opening a valve, which “softens” the compression of the front leg, so as to provide the desired steering effect. In FIG. 5, which is a diagram of a pneumatic system applicable to the present device, a two-way valve 90 is provided between an air cylinder leg 92, and an accumulator 94. When two-way valve 90 is actuated, it allows the leg air cylinder 92 volume to be increased to include the accumulator 94 volume. This creates the desired softening to cause the pogo to move in the direction of the softened leg. A check valve 96 is provided in the circuit between the accumulator and air cylinder leg to allow the accumulator pressure to normalize to the system pressure. A pressurization valve 98, suitably a Shrader type valve, enables the pressure of the overall system to be set by addition or release of air pressure to the pneumatic circuit. Thus, by increasing the pressure, a stiffer spring is provided, or by reducing the pressure, a more soft spring pogo is provided. [0029] The foot plate 24 provides a wide and comfortable platform on which to stand, which allows long periods of use without foot discomfort that would occur with the narrow foot rests of the prior art. [0030] A multiple rider embodiment of the device is also provided in accordance with the invention. In the multiple rider configuration, illustrated in FIG. 6, a rider platform and handle are provided which enable plural riders to position themselves about the pogo. In the preferred embodiment, the handle 100 is a circular handle member, and foot plate 24 is configured wider with foot receiving positions at multiple radially spaced locations about the device, to allow more than one user to ride and operate the device from various positions. [0031] Also shown in FIG. 6 is an optional large foot 104 which may be added or removed. The large foot is suitably convex on the bottom thereof. In a particular example, the foot may have a height of convexity of up to 2 inches. The large foot provides a wider area of contact with the ground, to enable, for example, use of the device indoors without damage to flooring as might otherwise occur with a smaller cross section foot. Further, a bumper member 106 may be
provided at the outer ends of 14, 16 and 18 (one such bumper being shown in FIG. 6) safety and to reduce damage to stationary objects should the pogo device collide with any object while in use. In a particular example, the foot may be between 1 and 12 inches in diameter, for example.

[0032] In yet another embodiment, the base shaft member 26 includes a flexing portion 102 at the base thereof, for example, an elastomeric portion, to provide some flexing to the handle to flex relative to the base. This flexing makes the handle able to flex away in the case that a rider unintentionally collides with the handle.

[0033] Another feature provided by the configuration of the pogo stick in accordance with the invention is that the legs may be moved inwardly or outwardly along the arms 14, 16 and 18 relative to the center of the pogo device, as indicated by arrows 80, 80 and 80° in FIG. 1. Therefore, as a user becomes more experienced at balancing, the overall footprint may be narrowed (or conversely, may be widened) to change the dynamics of the pogo device.

[0034] An alternate embodiment of the steering mechanism employs twisting of the handle (or a portion thereof) about axis 32 as shown in FIG. 1. In this configuration, rather than release handle 30 being present, the cable 78 is cooperatively attached to the rotational portion of the handle so as to actuate the cable to provide the desired result of allowing an additional spring or pneumatic member to be operable.

[0035] While the illustrated embodiment provides one leg with an alterable spring rate, a further embodiment enables all 3 legs (in a 3 leg device) to have the alterable spring rate. This alternate embodiment employs an additional mechanism such that the additional spring rate of the other legs may be engaged or disengaged. For example, the forward leg may be operated by the lever 30 or twist/rotation action of the handle, for forward motion, while left or right cant will provide left and right cant of the handle results in actuation of the other legs to steer left or right.

[0036] The three legged configuration provides a stable base, making it easy to operate the pogo stick. Unlike with a traditional pogo stick that has a single contact point with the ground, it is not necessary to learn to balance the pogo as much with the three leg configuration. It is further an advantage to have legs which compress vertically rather than radially, as in U.S. Pat. No. 3,328,028. With radial movement, there is the need for the leg to traverse the jumping surface laterally, which is of varying friction and will cause the pogo to unpredictably move laterally causing a balance problem.

[0037] While three legs are preferred, of course, other numbers of legs may be employed, if desired, with one or more providing steering features. A minimal system simply for improved stability would have two legs. The optimum number of legs for improved stability is three legs which provides stability in the X and Y directions. For a steerable pogo, a minimal configuration is three legs with the front leg with actuation to provide reduced spring rate. The configuration allows the rider to cant forward and, using his body, also go left and right. For steering left, right, and forward without using shifting the riders center of gravity, all three legs have actuation for reduced spring rate to cant the rider in the direction of reduced spring rate.

[0038] In the mechanical spring version, by changing one or more of the springs in the legs, the device can be modified to accommodate users of different weights. Additionally, the springs may be mechanically preloaded to allow adjustment of the spring rate to allow riders of varying weight.

[0039] A still further embodiment employs a boost mechanism, whether mechanical or pneumatic, to preload a spring (if mechanical) or “pump up” a pneumatic cylinder. Then on actuation of a release control by the rider, a vertical jumping “boost” is provided, thereby enhancing the vertical jumping.

[0040] In the preferred embodiment, the base shaft member 26 is substantially rigid, and is centrally positioned. The vertical rigidity of the shaft enables a rider to push down or pull up on the shaft. Because it is vertically constrained, a rider can apply torque and twist the device when jumping to do, for example, 180 degree or 360 degree twists or spins, which would not be possible with prior art devices.

[0041] The legs have independent suspension relative to one another and their spring operation is independent of one another, which enables the rider to jump in any direction. In the case of a particular three independent springing legs embodiment, each leg is suitably constrained to spring vertically; the springs are provided with lateral stability. The three legs thus provide a stable platform. By having legs with one degree of freedom, the rider is able to directionally control the device. In accordance with the prior art, such control is difficult, because prior art devices have multiple degrees of freedom. In use a rider can, for example, land on one leg and do tricks.

[0042] In a two legged embodiment, adapted for a single rider, the two legs have corresponding independent suspension.

[0043] Thus, a stable and steerable pogo stick device is provided, which is more readily usable, without requiring learning of balance and control required for a standard pogo stick. The large footprint provides stability, while the wide foot rest enables use in comfortable foot ware or even bare foot, without foot discomfort.

[0044] While plural embodiments of the present invention has been shown and described, it will be apparent to those skilled in the art that many changes and modifications may be made without departing from the invention in its broader aspects. The appended claims are therefore intended to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:
1. A steerable pogo device comprising:
   a first leg having a first substantially fixed spring rate; and
   a second leg having a variable spring rate for enabling steering.
2. A pogo device comprising:
   at least two independent suspension legs, wherein said legs are substantially vertical in orientation to provide for enhanced stability.
3. The pogo device according to claim 2, wherein the number of legs is 3, to provide for optimum X and Y stability.
4. The pogo device according to claim 2, wherein one of said legs is denoted a forward leg, wherein said forward leg has a variable spring rate for assisted steering in the forward direction.

5. The pogo device according to claim 4, wherein the number of legs is 3.

6. The pogo device according to claim 5, wherein said legs other than said forward leg have a variable spring rate for enabling steering left, right, in addition to the steering in the forward direction provided by said front leg.

7. A pogo with a boost mechanism, mechanical or pneumatic, to either preload a spring or pump up a cylinder to allow the rider to actuate it after charging for a “boost” in vertical jumping.

8. The device in accordance with claim 1, further comprising interchangeable convex feet of large diameter for providing further stability and to enable use without abusing the floor.

9. The device in accordance with claim 1, further comprising interchangeable springs of varying spring rate.

10. The device in accordance with claim 1, further comprising adjustable preload of springs to accommodate different rider weights.

11. The device in accordance with claim 1, wherein the spacing width between ones of said legs is adjustable to vary the amount of stability enhancement and amount of steering assistance generated.

12. The device in accordance with claim 1, comprising a perimeter bumper for safety and to reduce damage to stationary objects.

13. The device in accordance with claim 1, further comprising a large footpad for the rider's feet for greater comfort and safety as well as permitting different rider positions for doing tricks.

14. The device in accordance with claim 1, further comprising a handle bar adapted for gripping by plural riders.

15. The device according to claim 14, wherein said handle bar is a substantially circular handlebar.

16. The device according to claim 14, further comprising a footpad to allow multiple riders to face each other and jump together.

17. The device according to claim 16, wherein said footpad is a substantially circular footpad.

18. The device in accordance with claim 1, wherein said variable spring rate is activated by twisting an activation member.

19. The device in accordance with claim 1, wherein said variable spring rate is activated by turning an activation member.

20. The device in accordance with claim 1, wherein said variable spring rate is activated by activating a lever member.

21. The device in accordance with claim 8, wherein said feet are substantially larger in diameter than the diameter of the spring support member.

22. The device in accordance with claim 2, comprising a substantially rigid central pole member.

23. The device in accordance with claim 2, wherein said legs comprises spring action legs.

24. The device in accordance with claim 23, wherein said legs are independent in their spring action relative one another.

25. The device in accordance with claim 23, wherein said legs are constrained to spring substantially in one axis.

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