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(54) **POGO DEVICE**

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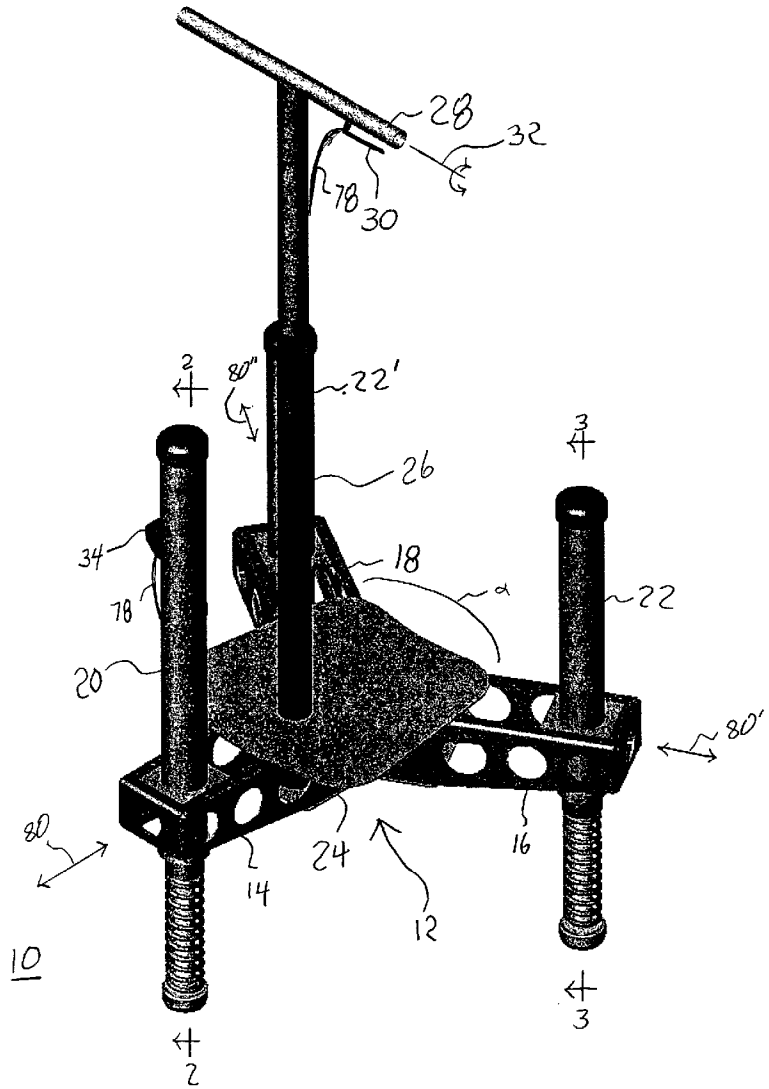
(57) **ABSTRACT**

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.



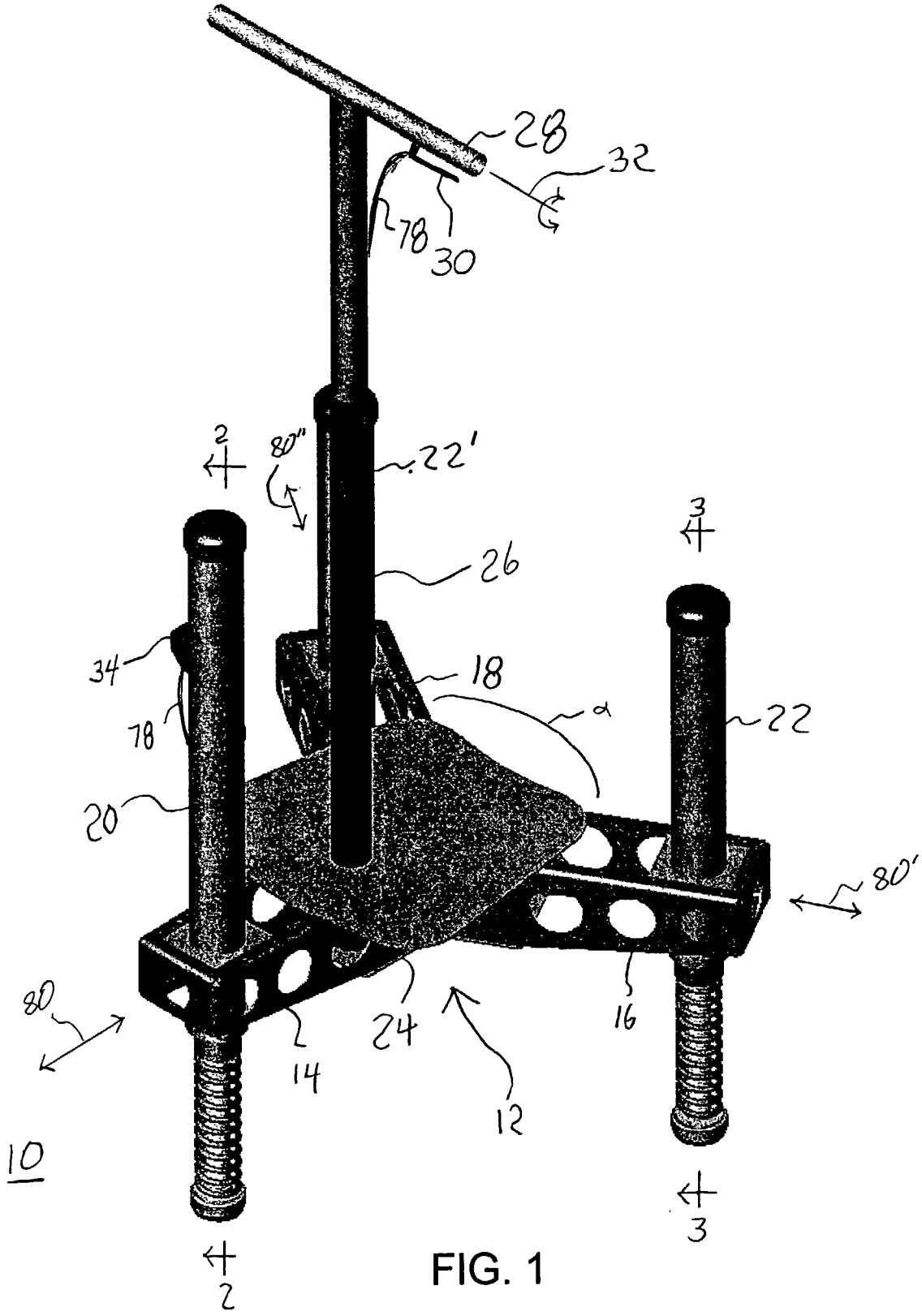


FIG. 1

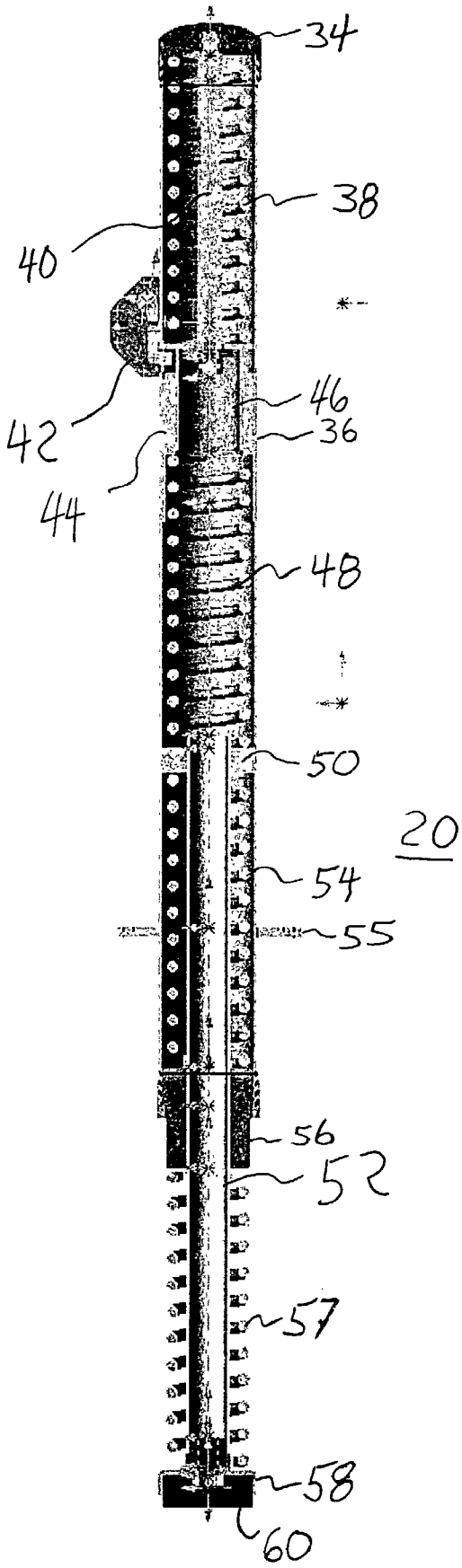


FIG. 2

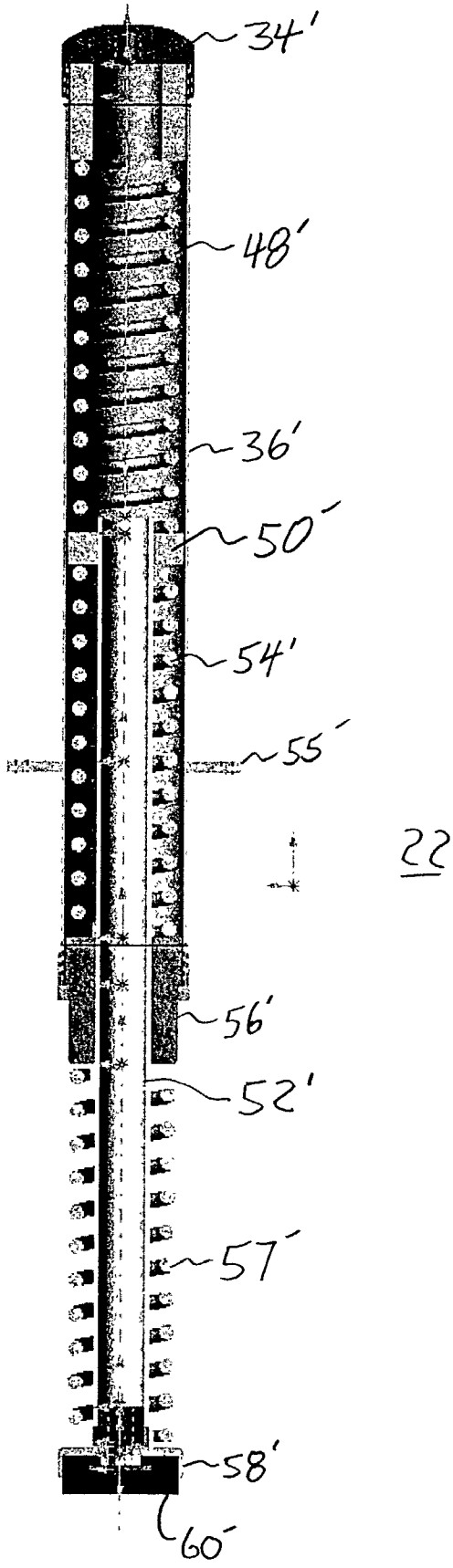


FIG. 3

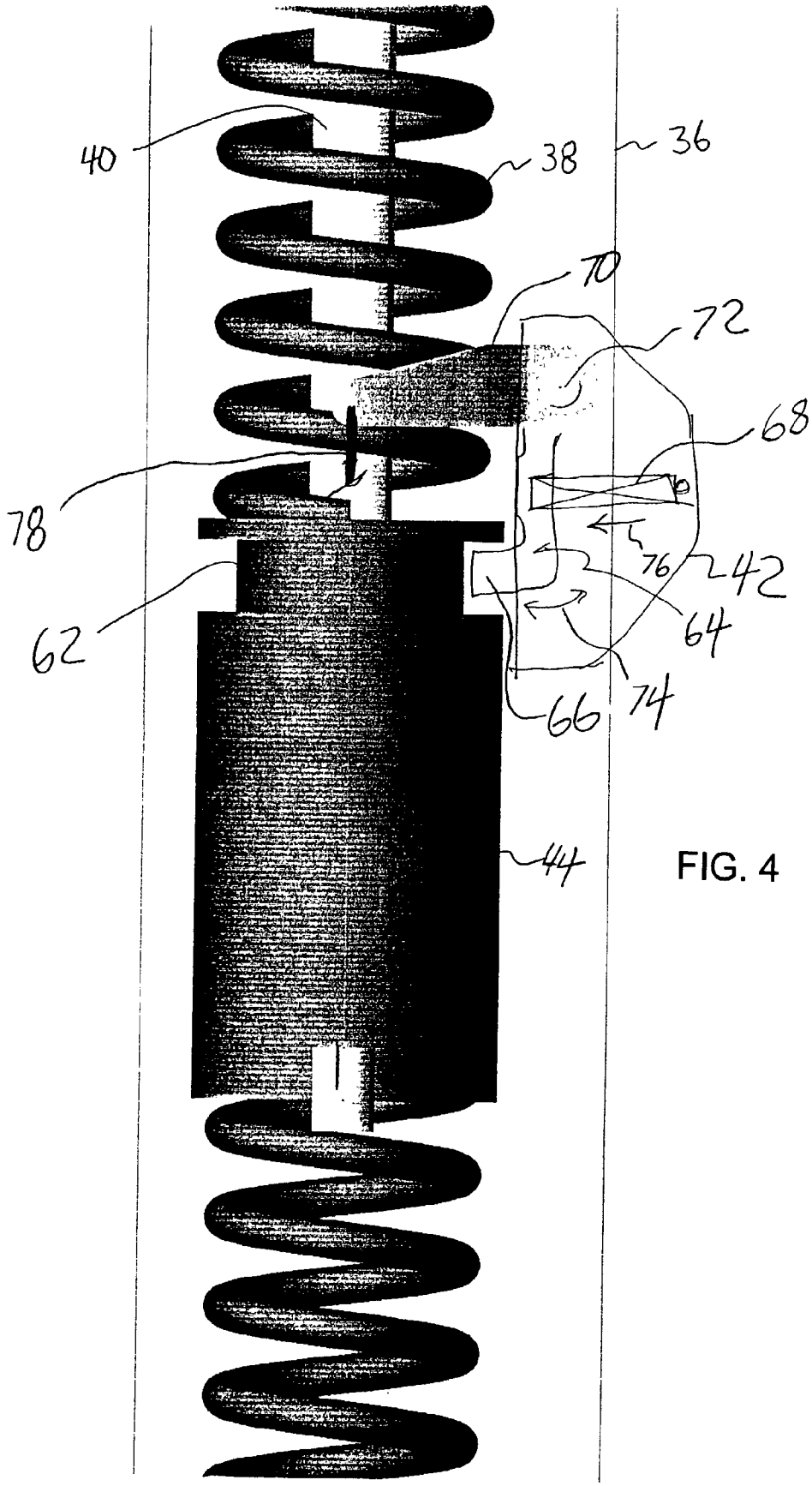


FIG. 4

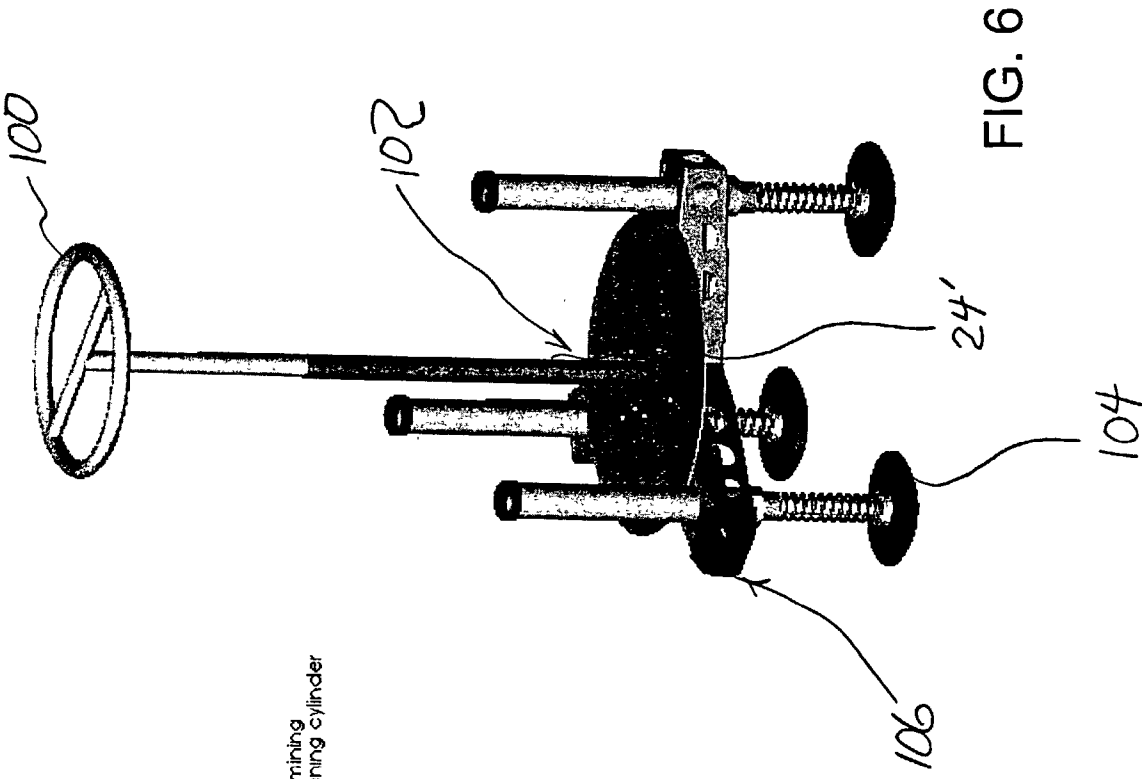

100
102
24'
104
106

FIG. 6

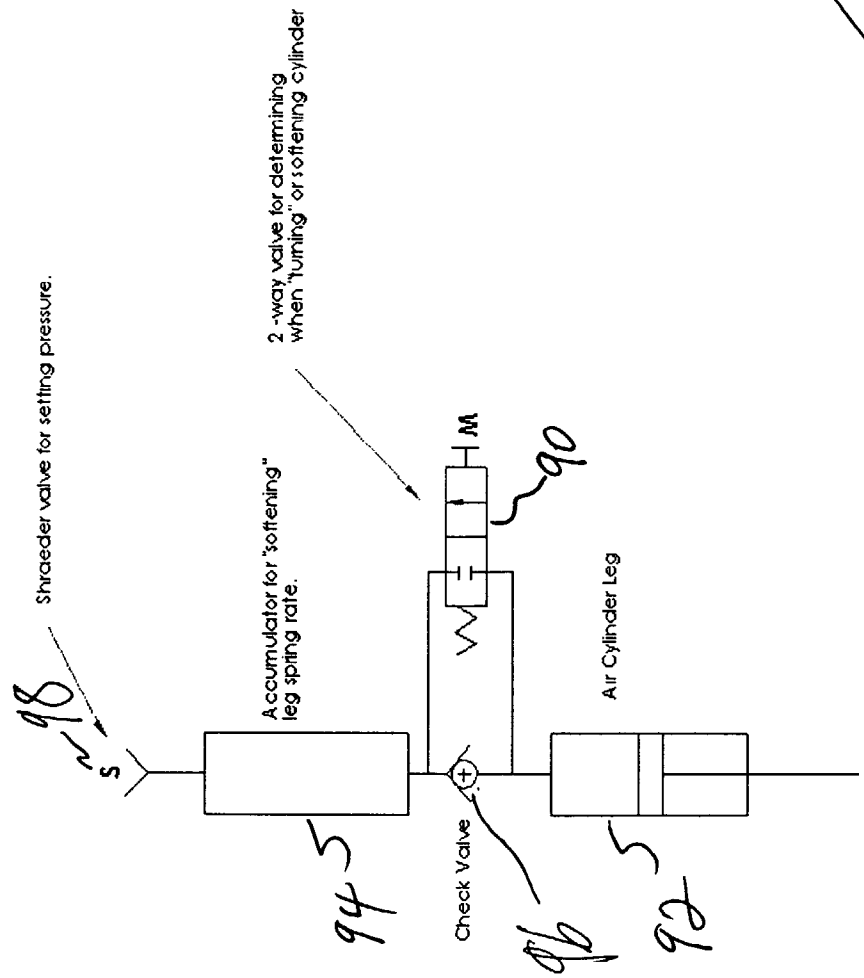

Shraeder valve for setting pressure.
98
S
Accumulator for "softening" leg spring rate.
2 -way valve for determining when "turning" or softening cylinder
M
90
Air Cylinder Leg
Check Valve
94
96
92

FIG. 5

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 users entire weight is supported in the arch of the foot. Long periods of use, even with sturdy shoes, can be tiresome to the bottom of the foot. Finally, traditional pogos 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 even 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 position 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 therewithin 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 **36**. 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 down and eventually feeding back up to the area of handle bar **28**, suitably operatively connecting to release handle **30**.

[**0024**] In operation, a user climbs onto the device, placing the left and right feet onto the foot plate **24**, suitably with the base shaft member **26** positioned to be 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 Shraeder 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 providable 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 space 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 our 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 then 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 type 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 interchangable 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.

* * * * *