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(54) **SKATE BRAKING SYSTEM**

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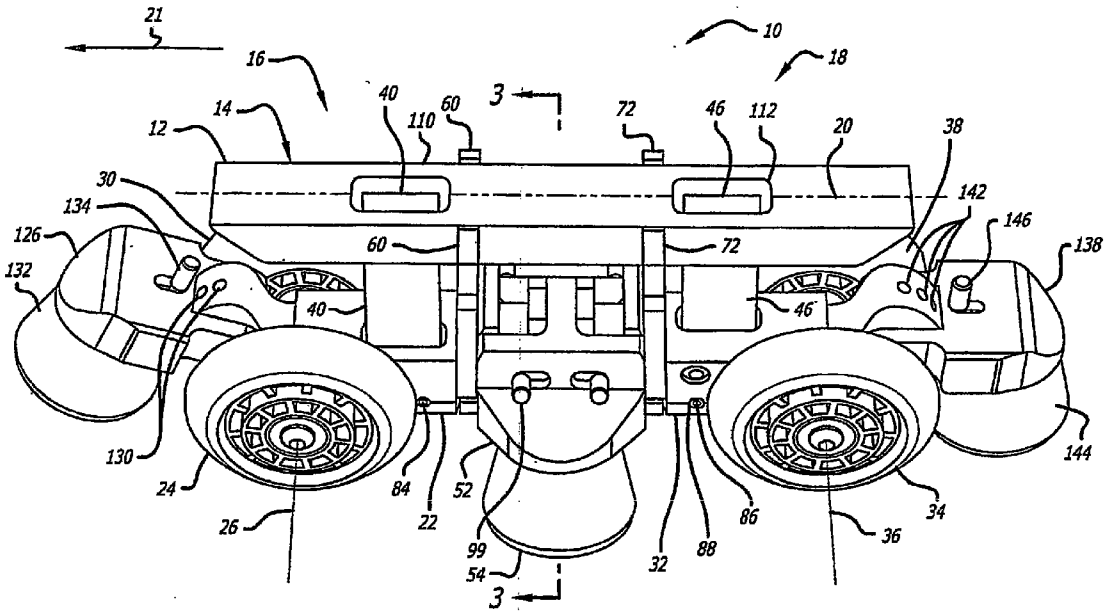
(57) **ABSTRACT**

A skate braking system includes a first wheel mount for holding wheels and a second wheel mount for holding additional wheels. A mounting plate is pivotally attached to the first and second wheel mounts. A first side brake mount for holding a first side brake pad and a second side brake mount for holding a second side brake pad are coupled to the mounting plate. The first side brake pad engages a skating surface when the mounting plate is tilted laterally in a first direction relative to the wheel mounts. The second side brake pad engages the skating surface when mounting plate is tilted laterally in a second direction opposite the first direction. The braking system may further include a biasing device for urging the mounting plate to have a normal orientation at which the first and second side brake pads do not engage the skating surface.



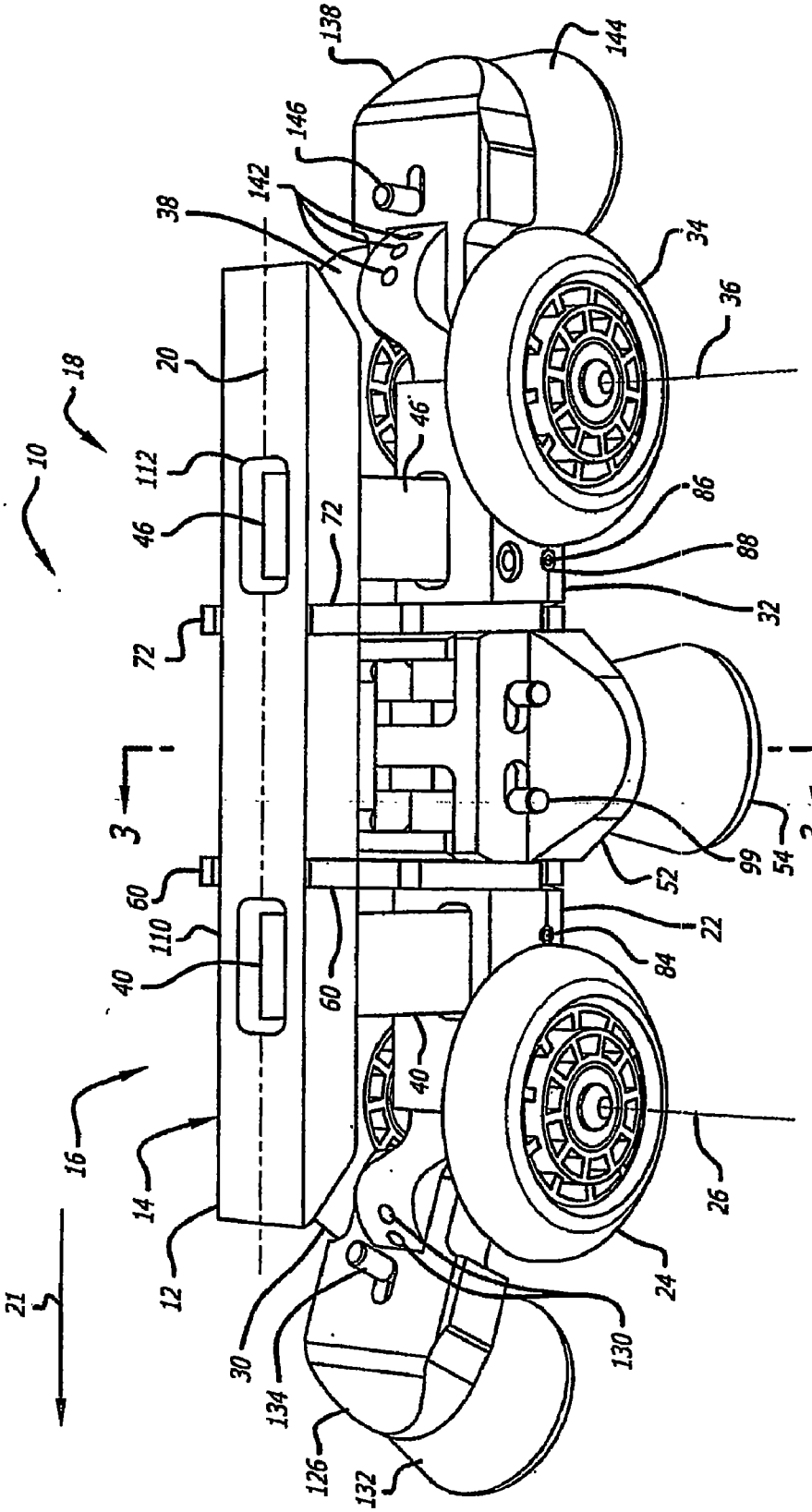

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FIG. 1

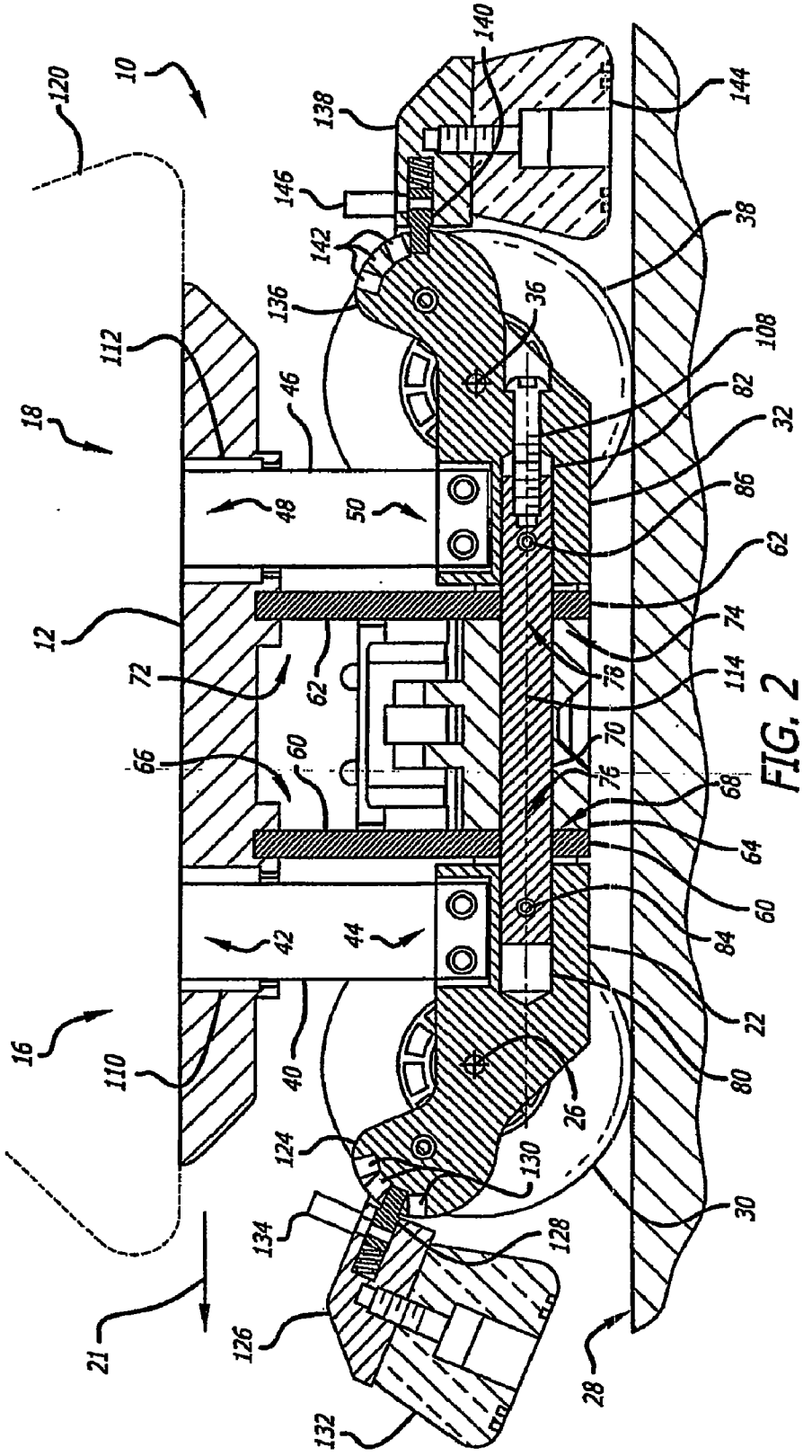
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FIG. 2

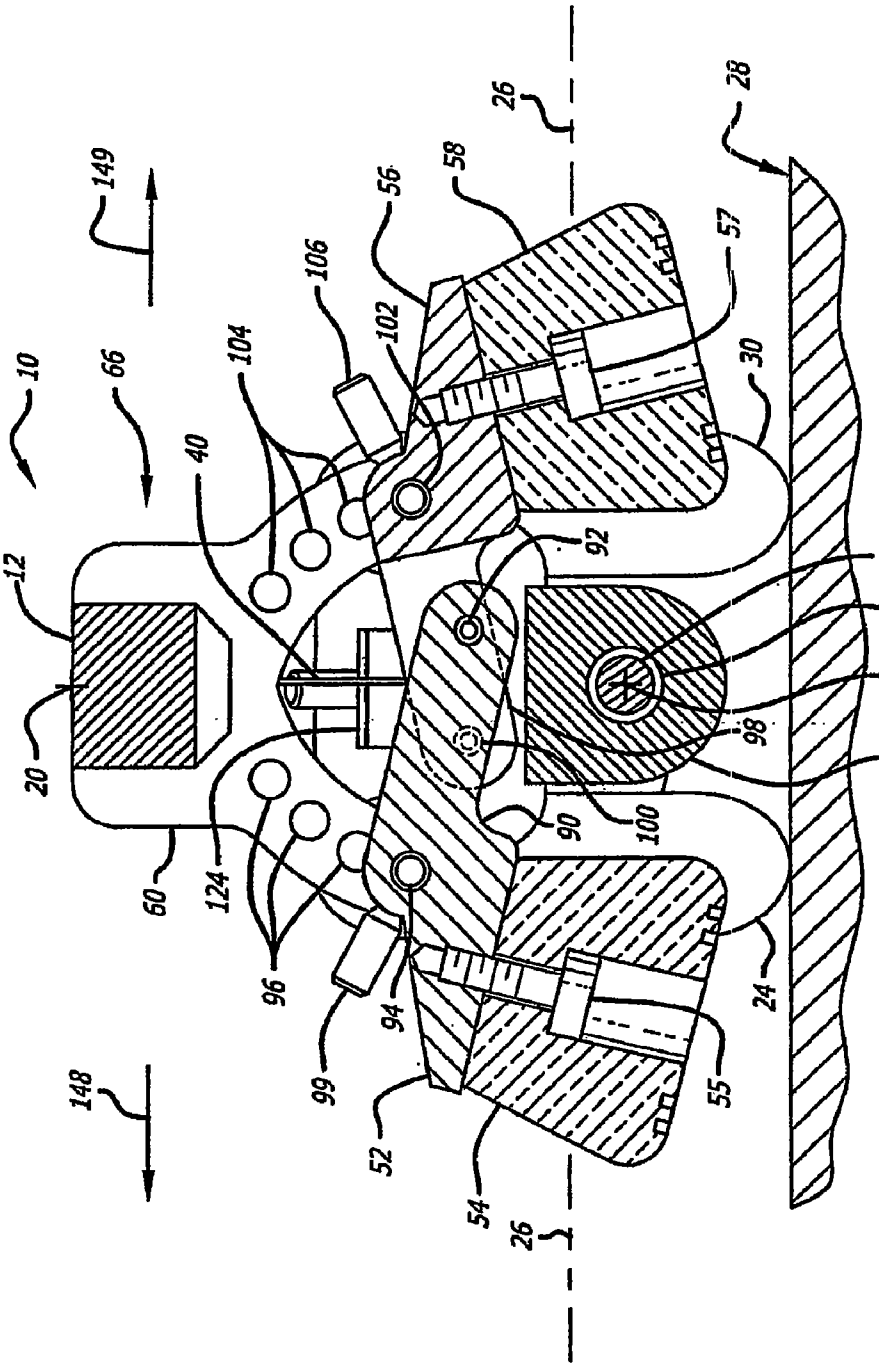
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FIG. 3

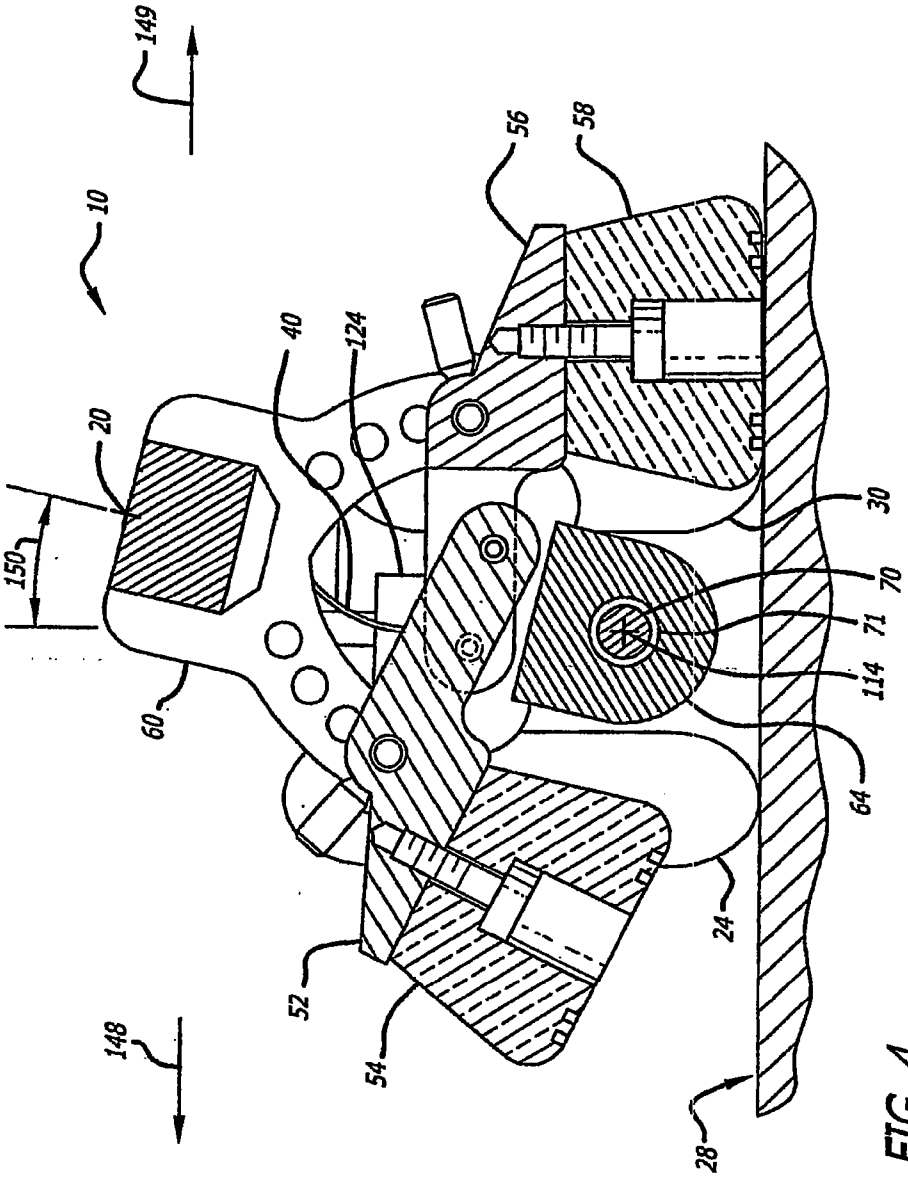

FIG. 4

SKATE BRAKING SYSTEM

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 60/731,581, filed Oct. 31, 2005, the contents of which are hereby incorporated by reference.

FIELD OF THE INVENTION

[0002] The invention relates generally to wheeled skates, and in particular, to wheeled skates with brakes.

BACKGROUND OF THE INVENTION

[0003] Many people find it difficult to learn how to use wheeled skates, such as roller skates and in-line skates. Being able to slow down and stop is critical to maintaining control in order to avoid obstacles and prevent injury. A common technique for slowing down and stopping, referred to as a "T-stop," requires that the skater balance himself or herself on one skate while still moving forward, and positioning the other skate backward to form a ninety degree angle with the forward moving skate. In a "V-stop," the skater uses both feet to form a V-shape so that the skates converge onto each other, or diverge from each other, in order to slow down and eventually stop. Both T-stops and V-stops feel awkward to a novice skater, which makes these techniques difficult to master. Also, these techniques may not allow a skater traveling at a high speed to slow down and stop within a short distance.

[0004] Various types of brakes have been developed to help the skater slow down and stop. Conventional roller skates have a forward brake pad, known as a toe stop, which can be dragged on the ground. To use the toe stop, the skater shifts most or his or her weight on one skate while moving forward, and positions the other skate backward and slants it so that the rear wheels are lifted off the ground. Rear brake pads or heel stops have also been attached to in-line skates or roller blades. With a heel stop, the skater positions the "braking" skate forward and slants it so that the forward wheels are lifted off the ground.

[0005] Braking systems have also been developed with a brake pad that engages a wheel to effect slowing down and stopping. Such braking systems may require special wheels or brake disks connected to the wheels, or may require the cuff of a tall boot to be used to engage the brake pad. These braking systems also may not allow the skater traveling at high speed to slow down and stop quickly.

[0006] In-line skates with side-mounted brakes are also known and may be used to effect a "hockey stop" or "side stop," a technique analogous to that used by ice skaters to stop. With known skates having a side-mounted brake, the skater must shift much of his or her weight to one side or tilt the wheels of the skate at an angle to the ground, which can feel awkward or uncomfortable.

[0007] A need exists for a braking system that can be used with a variety of foot platforms, such as a shoe, boot, or a board. A need also exists for a braking system that can be used with conventional wheels and with readily available stops or brake pads. A need also exists for a braking system that allows the skater to slow down or stop quickly with a natural and relaxed motion. A need also exists for a braking system that can be easily adjusted to suit a skater's skating style or skill level.

[0008] The features and advantages of the invention will be more readily understood from the following detailed description which should be read in conjunction with the accompanying drawings.

SUMMARY OF THE INVENTION

[0009] Briefly and in general terms, the present invention is directed to skate braking system that can be used with roller skates, in-line skates, skate boards, and other types of wheeled skates to allow the rider to slow down or stop. The braking system comprises a first wheel, a mounting plate, and a first side brake mount. The first wheel mount is adapted to rotatably hold a first wheel about a first rotational axis. The mounting plate is pivotally attached to the first wheel mount so as to permit the mounting plate tilt. The first side brake mount is adapted to hold a first side brake pad for engaging a skating surface contacting the first wheel. The first side brake mount is coupled to the mounting plate such that the side brake pad engages the skating surface when the mounting plate is tilted.

[0010] In other aspects of the present invention, the first side brake mount is adjustably coupled to the mounting plate. The first side brake mount has an adjustment device configured to selectively secure the first side brake mount to the mounting plate in a plurality of orientations including a first orientation in which the first side brake pad engages the skating surface when the mounting plate is tilted through a first angle, and a second orientation in which the first side brake pad engages the skating surface when the mounting plate is tilted through a second angle less than the first angle.

[0011] Other aspects of the invention may further comprise a second side brake mount adapted to hold a second side brake pad for engaging the skating surface. The second side brake mount is coupled to the mounting plate such that the second side brake pad engages the skating surface when the mounting plate is tilted in a direction opposite the first direction.

[0012] In detailed aspects, the mounting plate may be pivotally coupled to the first wheel mount at a tilt axis located closer to the skating surface than the first rotational axis. The system may further comprise a support member and a rod. The support member is fixedly attached to the mounting plate, is disposed between the first and second wheel mounts, and is pivotally attached to both the first and second wheel mounts about a bore formed through the support member. The rod includes a rod including a forward portion attached to the first wheel mount and a rear portion attached to the second wheel mount. The rod extends through the bore formed through the support member.

[0013] The braking system may, in further aspects, comprise a tilt sensitivity adjustment device that includes a threaded member in thread engagement with the rear portion of the rod. Preferably, the threaded member is configured to be rotated so as to move axially in relation to the rod. The threaded member is preferably further configured to push the second wheel mount toward the first wheel mount, thereby altering compression applied by the first and second wheel mounts to the support member.

[0014] In yet other aspects of the present invention, the mounting plate has a normal orientation in which the first side brake pad does not engage the skating surface, and the braking system further comprises a biasing device configured to urge the mounting plate to the normal orientation when the mounting plate is tilted laterally away from the normal orientation. Preferably, the biasing device comprises a spring

member having a first end constrained within a slot formed in the mounting plate and a second end fixedly attached to the first wheel mount. The first end of the spring member is configured to move within the slot. The biasing device may comprise at least one flat plate formed of a resilient material configured to flex so as to allow the mounting plate to tilt laterally.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. **1** is perspective view of a skate braking system showing a first and second wheel mount, a mounting plate a pivotally attached to the wheel mounts, side brake mounts adjustably coupled to the mounting plate, a forward brake mount adjustably coupled to the forward wheel mount, and a rear brake mount adjustably coupled to the rear brake mount.

[0016] FIG. **2** is a longitudinal cross-sectional view of the skate braking system of FIG. **1** showing forward and support members connecting the mounting plate to the forward and rear wheel mounts, a longitudinally extending rod about which the support members and mounting plate may tilt relative to the wheel mounts, a biasing device configured to urge the mounting plate to have a normal position and comprising forward and rear spring members, a threaded bolt for adjusting resistance to tilting.

[0017] FIG. **3** is a lateral cross-sectional view of the skate braking system of FIG. **1** at line **3-3** showing the mounting plate in the normal position, a tilt axis at which the mounting plate is pivotally connected to the wheel mounts and about which the mounting plate may tilt, pivot points about which the side brake mounts may be pivoted to adjust the height level of the side brake pads.

[0018] FIG. **4** is a lateral cross-sectional view of the skate braking system of FIG. **1** showing the mounting plate tilted in a lateral direction away from the normal position, the forward spring member being flexed, and the second side brake pad engaging the skating surface when the mounting plate is tilted at an angle in relation to the wheel mounts.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] Referring now in more detail to the exemplary drawings for purposes of illustrating embodiments of the invention, wherein like reference numerals designate corresponding or like elements among the several views, there is shown in FIG. **1**, a perspective view of a skate braking system **10** comprising a mounting plate **12** having an upper surface **14** adapted to be attached to or be part of a foot platform. Attachment can be rigid or flexible, and may incorporate a spring, hydraulic device, or shock absorbing device. As used herein, a foot platform is any structure on which the foot of a rider may be located. Examples of a foot platform include without limitation a shoe, a boot, or a board, or foot straps. The mounting plate **12** has a forward end **16**, a rear end **18**, and a longitudinal axis **20** that extends along the length of the plate from the forward end to the rear end. In other embodiments, the foot platform and the mounting plate **12** are integrally formed with each other as a unitary structure. As explained in detail below, the mounting plate **12** is configured to tilt laterally about a tilt axis **114** (FIG. **2**) that is substantially parallel to the longitudinal axis.

[0020] The braking system **10** includes a forward wheel mount **22** adapted to rotatably hold a forward left wheel **24** having a first rotational axis **26** that extends laterally. The forward wheel mount **22** is also configured to hold a forward right wheel **28** along the first rotational axis so as to be coaxial with the forward left wheel. The braking system **10** also includes a rear wheel mount **32** adapted to rotatably hold a rear left wheel **34** having a second rotational axis **36** that also extends laterally. The rear wheel mount **32** is also configured to hold a rear right wheel **38** along the second rotational axis so as to be coaxial with the rear left wheel. The rotational axes of the wheels are substantially perpendicular to the longitudinal axis **20** and the tilt axis **114** of the mounting plate **12**. It is to be understood that the wheels are oriented to roll in a generally longitudinal direction **21**. As described in detail below, the forward and rear wheel mounts **22**, **32** are pivotally attached to the mounting plate **12** so as to permit the mounting plate to tilt laterally about the tilt axis **114** relative to a skating surface **28** (FIG. **2**) contacting the wheels. As used herein, to tilt laterally includes tilting toward the left or the right side the mounting plate **12**.

[0021] Other embodiments of the present invention may have only one wheel mount configured to rotatably hold a plurality of wheels or may have more than two wheel mounts each configured to rotatably hold one or more wheels. In some embodiments, the wheels are arranged front-to-back, not side-to-side, in a manner similar or identical to in-line skates. The wheels may, in other embodiments, have a spherical, hemispherical, or other shape.

[0022] In FIG. **2** there is shown a cross-sectional view of the braking system **10** along the longitudinal axis **20** of the mounting plate **12**. The mounting plate **12** is shown connected to the base of a skate boot **120**. The forward wheel mount **22** is coupled to the forward end **16** of the mounting plate **12** by a forward spring member **40** having a top end **42** and a bottom end **44**. The rear wheel mount **32** is similarly coupled to the rear end **16** of the mounting plate **12** by a rear spring member **46** having a top end **4** and a bottom end **50**. The top ends **42**, **48** of the forward and rear spring members **40**, **46** are loosely attached to the mounting plate so as to be constrained with limited freedom of movement within slots **110**, **112** formed in the forward and rear ends **16**, **28**, respectively, of the mounting plate **12**. The bottom ends **44**, **50** are fixedly attached to the forward and rear wheel mounts **22**, **32**, respectively. In use, little or no downward column force is applied to the spring members since the top ends **42**, **48** of the spring members **40**, **46** are loosely attached to the mounting plate **12**. In other embodiments, the method of attachment may be reversed such one or both of the top ends **42**, **48** is fixedly attached to the mounting plate **12** and the corresponding bottom end is loosely attached to the wheel mount.

[0023] The forward and rear spring members **40**, **46** are each preferably formed of a flat piece of resilient material configured to flex so as to allow the mounting plate **12** to tilt to one side or the other while the forward and rear wheel mounts **22**, **32** and the wheels **24**, **30**, **34**, **38** maintain their orientation relative to the skating surface **28**. Suitable examples of a resilient material include without limitation metals, elastomers, plastics, fiber reinforced composites, and combinations thereof. The spring members **40**,**46** are shown in FIG. **2** at their natural, unflexed state. The spring members **40**, **46** act as a biasing device that urges the mounting plate **12** to return to its normally upright orientation relative to the forward and rear wheel mounts **22**, **32**. In operation, pressure applied by the foot of the rider on a selected side of the mounting plate **12** causes the mounting plate to pivot or tilt to the selected side of the mounting plate.

[0024] Referring now to FIGS. **1** and **2**, the top ends **42**, **48** of the forward and rear spring members **40**, **46** are disposed in forward and rear slots **110**, **112** formed in the mounting plate **12**. The slots **110**, **112** allow the forward and rear spring members **40**, **46** to shift slightly in position within the mounting plate **12** as the forward and rear spring members flex to one side or another. As the mounting plate **12** tilts in one lateral direction, the forward and rear spring members **40**, **46** will tend to pull slightly out of the slots **110**, **112** while simultaneously pushing the mounting plate **12** in the opposite lateral direction. The slots **110**, **112** preferably have a width selected to allow multiple layers of the resilient material to be combined as desired by the rider to adjust the flexibility of the forward spring member **40**, the rear spring member **46**, or both.

[0025] With continued reference to FIGS. **1** and **2**, the forward wheel mount **22** includes a forward brake support **124**. A forward brake mount **126** is pivotally attached to the forward brake support **124** and is secured in a selected position by a spring loaded adjustment device having a forward adjustment pin **128** that extends through the forward brake mount and into one of a plurality of apertures **130** in the forward brake support. The forward brake mount **126** is configured to hold a forward brake pad **132**. An adjustment knob **134** is connected to the forward adjustment pin to allow a rider to quickly and easily change the position of the forward brake mount **126** so as to adjust the height level of the forward brake pad **132** relative to the skating surface **28**.

[0026] The rear wheel mount **32** includes a rear brake support **136**. A rear brake mount **138** is pivotally attached to the rear brake support **136** and is secured in a selected position by a spring loaded adjustment device having a rear adjustment pin **140** that extends through the rear brake mount and into one of a plurality of apertures **142** in the rear brake support. The rear brake mount **138** is configured to hold a rear brake pad **144**. An adjustment knob **146** is connected to the rear adjustment pin to allow a rider to quickly and easily change the position of the rear brake mount **138** so as to adjust the height level of the rear brake pad **144** relative to the skating surface **28**. In other embodiments, the forward and rear brake mounts **126**, **138** may be secured in selected positions by other types of devices known in the art, such as a threaded bolt.

[0027] The forward brake pad **132** engages the skating surface **28** when the rider slants the mounting plate **12** forward, such as when the rear wheels **34**, **38** are raised above the skating surface. The rear brake pad **144** engages the skating surface **28** when the rider slants the mounting plate **12** backward, such as when the forward wheels **24**, **30** are raised above the skating surface. It will be appreciated that since the forward and rear brake pads **132**, **144** move with the forward and rear wheel mounts **22**, **32**, respectively, the forward and rear brake pads do not necessarily engage the skating surface when the mounting plate **12** is tilted laterally.

[0028] In FIG. **3** there is shown a cross-sectional view of the braking system **10** along line **3-3** in FIG. **1**. The mounting plate **12** is pivotally attached to the forward and rear wheel mounts **22**, **32** at a tilt point located on the tilt axis **114**. The mounting plate **12** is able to tilt laterally about the tilt axis **114**. The tilt axis **114** is closer to the skating surface **28** than the rotational axis **26** of the forward wheels **24**, **30**. In other embodiments, the tilt axis **114** may be at the same height level as the rotational axis **26**.

[0029] As shown in FIGS. **1** and **3**, the braking system **10** further comprises a first side brake mount **52** adapted to hold a first side brake pad **54** for engaging the skating surface **28**. The braking system also includes a second side brake mount **56** adapted to hold a second side brake pad **58** for engaging the skating surface **28**. The first and second side brake mounts include threaded bolts **55**, **57** or other retaining device for securing the first and second side brake pads **54**, **58**. The side, forward, and rear brake pads **54**, **58**, **132**, **144** may take the form of conventional stops or other configurations. In other embodiments, they may have a hemispherical, oval, conical, or other shape, and they may have sizes and shapes different from each other.

[0030] As described in detail below, the first side brake mount **52** is coupled to the mounting plate **12** such that the attached first side brake pad **54** engages the skating surface when the mounting plate **12** is tilted in a first lateral direction **148**. The second side brake mount **56** is coupled to the mounting plate **12** such that the attached second side brake pad **58** engages the skating surface when the mounting plate **12** is tilted in a second lateral direction **149** opposite the first direction.

[0031] Referring to FIGS. **1-3**, the first and second side brake mounts **52**, **56** are coupled to the mounting plate **12** by a forward support member **60**, a rear support member **62**, and a spacer **64** disposed between the support members **60**, **62**. The forward support member **60** has a top portion **66** fixedly attached to the mounting plate **12** and a bottom portion **68** pivotally attached by a cylindrical rod **70** to the forward and rear brake mounts **22**, **32**. The rear support member **62** has a top portion **72** fixedly attached to the mounting plate **12** and a bottom portion **74** pivotally attached by the rod **70** to the forward and rear wheel mounts **22**, **32**. The rod **70** extends through a bore **71** formed in each of the forward wheel mount **22**, the bottom portion **68** of the forward support member **60**, the spacer **64**, the bottom portion **74** of the rear support member **62**, and the rear wheel mount **22**, **32**. Each bore **71** through the various parts is oriented to run longitudinally in a direction parallel to the longitudinal axis **20** of the mounting plate **12**, so that the rod **70** and the tilt axis **114** are parallel to the longitudinal axis. In other embodiments, the bore **71** may run at an angle from the longitudinal axis **70**, so that tilt axis **114** is oriented at an angle from the longitudinal axis.

[0032] With particular reference to FIG. **2**, the rod **70** has a forward portion **76** and a rear portion **78**. The forward portion **76** extends into a bore **80** formed in the forward wheel mount **22** and the rear portion **78** extends into a bore **82** formed in the rear wheel mount **32**. The rod **70** is fixedly attached to the forward and rear wheel mounts **22**, **32** by laterally extending pins **84**, **86** that prevent the wheel mounts from rotating about the rod. Preferably, the forward and rear support members **60**, **62** and the spacer **64** are able to rotate together about the rod **70**. In other embodiments, the forward and rear support members **60**, **62** and the spacer **64** are integrally formed as a single, unitary support member.

[0033] In other embodiments, a bearing or other friction-reducing device is disposed around the rod **70** to facilitate rotation of the forward and rear support members **60**, **62** and the spacer **64**. In use, increased pressure applied by the rider on any one side of the mounting plate **12** causes the forward and rear support members **60**, **62** and the spacer **64** to tilt along with the mounting plate while the forward and rear wheel mounts **22**, **32** and the wheels maintain their upright orientation relative to the skating surface **28**.

[0034] Preferably, the forward and rear support members **60**, **62**, and not the forward and rear spring members **40**, **46**, bear all or most of the weight of the rider. That is, the forward and rear support members communicate the weight of the rider from the mounting plate **12** to wheel mounts **22**, **32** and to the wheels. Because the support members **60**, **62** bear all or most of the weight of the rider, little or no downward force is applied to the spring members **40**, **46** when they are flexed. In this way, the spring members **40**, **46** will not buckle due to downward compression during use.

[0035] The rod **70** defines the tilt axis **114** (FIG. **2**) about which the mounting plate **12** may be tilted relative to the forward and rear wheel mounts **22**, **32**. The tilt axis **114** is positioned at a short distance from the skating surface **28**, preferably though not necessarily below the rotational axes **26**, **36** of the wheels **24**, **30**, **34**, **38**. In other embodiments, the tilt axis **114** is located so as to be level with or above the rotational axes. A short distance from the skating surface, corresponding to relatively low location for the rod **70** and the tilt axis **114**, provides for greater stability. "Jack knifing" or overall buckling of the braking system **10** occurs under certain circumstances when the wheel mounts **22**, **32** tilt to one side and because the tilt axis **114** is relatively high, the downward force due to the weight of the rider is centered away from the wheels so as to urge the wheel mounts to tilt further to one side until the wheel mounts have completely tilted over onto the skating surface. Jack knifing is less likely to occur when the tilt axis **114** is relatively low since the downward force due to the weight of the rider is centered closer to the wheels, which would influence the wheel mounts to return to an upright orientation.

[0036] A relatively low location for the rod **70** and thus, the tilt axis **114**, also allows for the side brake pads **54**, **58** to be positioned closer to the wheels so as to be unobtrusive. The side brake pads **54**, **58** would be obtrusive and possibly interfere with skating if they extend too far beyond either side of the wheels. A relatively high location for the tilt axis **114** requires that a side brake pad be positioned further to one side of the wheels in order for the side brake pad to engage the skating surface **28** when the mounting plate **12** is tilted at a given angle. It will be appreciated that a low location for the tilt axis **114** allows a side brake pad, at a given distance from the wheels, to engage the skating surface with less rotation of the mounting plate **12** as compared to a relatively high location for the tilt axis.

[0037] Referring to FIG. **3**, the first and second side brake mounts **52**, **56** are adjustably coupled to the mounting plate **12**. The first side brake mount **52** has a central arm **90** that is pivotally attached to the spacer **64** at a first pivot point **92**. At another point spaced apart from the first pivot point, the first side brake mount is attached to the forward support member **60** by a spring loaded adjustment device having an adjustment pin **94** that extends through the first side brake mount and into one of a first plurality of apertures **96** formed in the forward support member. Although not shown in FIG. **3**, the first side brake mount is also attached to the rear support member **62** by another spring loaded adjustment device having an adjustment pin that extends through the first side brake mount and into one of another plurality of apertures formed in the rear support member. In use, the adjustment pins on the first side brake mount may be selectively pulled in and out of the apertures in the forward and rear support members so as to allow adjustment of the height level of the first side brake pad **54** relative to the skating surface **28**. The adjustment pin **92** is attached to a knob **99** for pushing the adjustment pin **94** out of an aperture.

[0038] Still referring to FIG. **3**, the second side brake mount **56** has a first arm **98** that is pivotally attached to the forward support member **60** at a second pivot point **100**. Although not shown in FIG. **3**, the second side brake mount has a second arm that is pivotally attached to the rear support member **62** at a third pivot point that is longitudinally in-line or coaxial with the second pivot point **100**. At another point spaced apart from the second pivot point, the second side brake mount is attached to the forward support member by a spring loaded adjustment device having an adjustment pin **102** that extends through the first side brake mount and into one of a second plurality of apertures **104** formed in the forward support member. Although not shown in FIG. **3**, the second side brake mount is also attached to the rear support member **62** by another spring loaded adjustment device having a pin that extends through the second side brake mount and into one of yet another plurality of apertures formed in the rear support member. In use, the adjustment pins on the second side brake mount may be selectively pulled in and out of the apertures in the forward and rear support members so as to adjust the height level of the second side brake pad **58** relative to the skating surface **28**. The adjustment pin **102** is attached to a knob **106** for pulling the adjustment pin **102** out of an aperture. In other embodiments, threaded bolts or other retaining devices may secure the first and second side brake mounts at an orientation selected by the rider.

[0039] It will be appreciated that first and second side brake mounts **52**, **56** can be easily and quickly secured in a plurality of orientations corresponding to different height levels from the skating surface. With a relatively low height level, the side brake pads **54**, **48** on the brake mounts will engage the skating surface **28** after traveling through a relatively small angle when a rider applies foot pressure to one or the other side of the mounting plate **12**. With a relatively high height level, the brake pads on the brake mounts will engage the skating surface after traveling through a relatively large angle when the rider applies foot pressure to one or the other side of the mounting plate **12**. It will be appreciated that the height level of the first and second brake mounts may be adjusted independently of one another to suit the type of skating surface or to suit the skill level or skating style of the rider. In addition, the height level may be adjusted to compensate for a brake pad wearing out through use.

[0040] With continued reference to FIG. **3**, the first pivot point **92** of the first side brake mount **52** is spaced apart from the second pivot point **100** of the second side brake mount **56**. The location of the first and second pivot points **92**, **100** are selected such a change in the angular position of the side brake mount corresponds to the same or a similar change in the mounting plate tilt angle that is necessary to cause the side brake mount to engage the skating surface. In other embodiments, the first and second pivot points **92**, **100** may coincide.

[0041] In other embodiments, spring-type devices, resilient pads, or shock absorbing devices attach any number of the side, forward, and rear brake pads **54**, **58**, **132**, **144** to the side brake mounts **52**, **56**, **126**, **138** so that, when the either brake pad contacts the skating surface **28**, a downward force applied by the brake pad on the skating surface increases gradually as the mounting plate **12** is tilted further by the rider. In this way, friction with the skating surface increases gradually. In part, the shock absorbing devices allow for gradual or smooth

braking and desirably prevent an overly sudden stop from occurring when the brake pad first contacts the skating surface **28**. In other embodiments, the side, forward, and rear brake pads **54**, **58**, **132**, **144** are adapted to rotate, either freely spinning or with some resistance to spinning, so as not to jar the skater while in a turning or stopping motion.

[0042] Referring once again to FIG. **2**, the forward portion **76** of the rod **70** is attached to the forward wheel mount **22** by a forward pin **84** extending through apertures formed through the forward portion and through the forward wheel mount such that longitudinal movement of the forward wheel mount relative to the rod is prevented. The rear portion **78** of the rod **70** is attached to the rear wheel mount **32** by a rear pin **86** extending through an aperture formed through the rear portion and a slot through the rear wheel mount such that longitudinal movement of the rear wheel mount relative to the rod is limited but not prevented. As can be seen in FIG. **1**, the rear pin **86** extends from the rod **70** and into a slot **88** formed through the rear wheel mount **32**. The slot **88** is larger than the rear pin **86** so as to allow some longitudinal movement that is controlled by a threaded member or bolt **108** within the rear wheel mount **32**.

[0043] The bolt **108** engages a shoulder of a counterbore formed in the rear wheel mount **32** and engages a threaded bore in the rear portion **78** of the rod **70**. The bolt **108** is coupled to the forward wheel mount **22** by means of the rod **70** and forward pin **84**. The head of the bolt **108** is accessible from the counterbore on the rear wheel mount **32**. The bolt **108** may be selectively tightened or loosened to adjust the compression force between the forward and rear wheel mounts **22**, **32**. When tightened, the head of the bolt **108** pushes the rear wheel mount **32** toward the forward rear mount **22**, thereby increasing the compression force. The compression force acts on the forward and rear support members **60**, **62** and the spacer **64** on which the first and second side brake mounts **52**, **56** are mounted. In part, the rod **70** and bolt **108** act as a tilt sensitivity adjustment device for changing the sensitivity of the braking system **10** to actions of the rider. By rotating the bolt **108** and causing it to move axially relative to the rod **70**, the rider may control the resistance of the mounting plate **12** against lateral tilting. With a relatively high compression force, the braking system is less sensitive in that a rider must apply a relatively high pressure on the mounting plate **12** in order to tilt either of the first and second side brake mounts **52**, **56** toward the skating surface **28**. With a relatively low compression force, the braking system is more sensitive in that the rider need apply a relatively low pressure on the mounting plate **12** in order to tilt either of the first and second side brake mounts toward the skating surface.

[0044] Referring next to FIG. **4**, the mounting plate **12** has been rotated about the tilt axis **114** in a lateral direction **149** away from a normal orientation of the mounting plate **12** shown in FIGS. **1-3**. The second side brake pad **58** has been secured in a selected orientation or height level. The longitudinal axis **20** of the mounting plate **12** remains parallel to the skating surface **28** while the mounting plate is tilted through a first angle **150** at which the second side brake pad **58** engages the skating surface. The forward spring member **40** is flexed laterally and urges the mounting plate **12** to move in an opposite lateral direction **148** and return to the normal position. The forward wheel mount **22**, the forward brake pad **132**, and the forward left and right wheels **24**, **30** maintain their upright orientation on the skating surface **28** while the mounting plate **12** is tilted laterally. Although not visible in FIG. **4**, the rear wheel mount **32**, rear brake pad **144**, and the rear left and right wheels **34**, **38** also maintain their upright orientation on the skating surface. It will be appreciated that when the second side brake pad **58** is secured at a lower orientation or height level, the second side brake pad will engage the skating surface **28** after the mounting plate **12** is tilted through a second angle that is less than the first angle.

[0045] While several particular forms of the invention have been illustrated and described, it will also be apparent that various modifications can be made. A non-limiting example of a modification includes the use of other types of wheel mounts, such as trucks used on skates and skateboards. Another non-limiting example of modifications includes the use of other types of biasing devices for urging the mounting plate to the normal orientation, such as torsion springs and resilient pads formed of elastomeric material. It is also contemplated that various combinations or subcombinations of the specific features and aspects of the disclosed embodiments can be combined with or substituted for one another in order to form varying modes of the invention. Accordingly, it is not intended that the scope of the invention be limited, except as by the appended claims.

What is claimed is:

1. A skate braking system comprising:

a first wheel mount adapted to rotatably hold a first wheel about a first rotational axis extending laterally;

a mounting plate pivotally attached to the first wheel mount so as to permit the mounting plate to tilt laterally; and

a first side brake mount adapted to hold a first side brake pad for engaging a skating surface contacting the first wheel, the first side brake mount coupled to the mounting plate such that the side brake pad engages the skating surface when the mounting plate is tilted in a first lateral direction.

2. The system of claim **1** wherein the first side brake mount includes an adjustment device configured to selectively secure the first side brake mount to the mounting plate in a plurality of orientations including a first orientation in which the first side brake pad engages the skating surface when the mounting plate is tilted through a first angle, and a second orientation in which the first side brake pad engages the skating surface when the mounting plate is tilted through a second angle less than the first angle.

3. The system of claim **1** further comprising a second side brake mount adapted to hold a second side brake pad for engaging the skating surface, the second side brake mount coupled to the mounting plate such that the second side brake pad engages the skating surface when the mounting plate is tilted in a second lateral direction opposite the first lateral direction.

4. The system of claim **1** wherein the mounting plate is pivotally coupled to the first wheel mount at a tilt axis located closer to the skating surface than the first rotational axis.

5. The system of claim **1** wherein the first wheel mount is configured to rotatably hold a first plurality of wheels including the first wheel.

6. The system of claim **1** further comprising a second wheel mount adapted to rotatably hold a second wheel about a second rotational axis, the second wheel mount pivotally attached to the mounting plate so as to permit the mounting plate to tilt laterally.

7. The system of claim **6** wherein the second wheel mount is configured to rotatable hold a second plurality of wheels including the second wheel.

8. The system of claim **6** further comprising a forward brake mount and a rear break mount, the forward brake mount pivotally attached to the first wheel mount and adapted to hold a forward brake pad, the rear break mount pivotally attached to the second wheel mount and adapted to hold a rear brake pad.

9. The system of claim **6** further comprising:

a support member fixedly attached to the mounting plate, the support member disposed between the first and second wheel mounts and pivotally attached to both the first and second wheel mounts about a bore formed through the support member;

a rod including a forward portion attached to the first wheel mount and a rear portion attached to the second wheel mount, the rod extending through the bore formed through the support member.

10. The system of claim **9** further comprising a tilt sensitivity adjustment device configured to control resistance of the mounting plate to tilting laterally.

11. The system of claim **10** wherein the tilt sensitivity adjustment device includes a threaded member in thread engagement with the rear portion of the rod, the threaded member configured to be rotated so as to move axially in relation to the rod, the threaded member further configured to push the second wheel mount toward the first wheel mount, thereby altering compression applied by the first and second wheel mounts to the support member.

12. The system of claim **1** wherein the mounting plate has a normal orientation in which the first side brake pad does not engage the skating surface;

the system further comprising a biasing device configured to urge the mounting plate to the normal orientation when the mounting plate is tilted laterally away from the normal orientation.

13. The system of claim **12** wherein the biasing device comprises a spring member having a first end constrained within a slot formed in the mounting plate and a second end fixedly attached to the first wheel mount, the first end configured to move within the slot.

14. The system of claim **12** wherein the biasing device comprises at least one flat plate formed of a resilient material configured to flex so as to allow the mounting plate to tilt laterally.

15. A skate braking system comprising:

a first wheel mount adapted to rotatably hold a first wheel about a rotational axis;

a mounting plate pivotally attached to the first wheel mount so as to allow the mounting plate to tilt about a tilt axis oriented at an angle from the rotational axis, the mounting plate having normal orientation in relation to the first wheel mount; and

a side brake mount adapted to hold a side brake pad for engaging a skating surface contacting the first wheel, the side brake mount coupled to the mounting plate such that the side brake pad does not engage the skating surface when the mounting plate is in the normal orientation and engages the skating surface when the mounting plate is tilted away from the normal orientation.

16. The system of claim **15** wherein the tilt axis is located at a first distance from the slating surface, and the second rotational axis is located at a second distance from the skating surface, the second distance greater than or equal to the first distance.

17. The system of claim **15** wherein the mounting plate has a longitudinal axis substantially perpendicular to the rotational axis of the first wheel, the longitudinal axis being parallel to the skating surface when the mounting plate is tilted away from the normal orientation.

18. The system of claim **15** further comprising a foot platform and the mounting plate forms part of the foot platform.

19. The system of claim **15** further comprising:

a second wheel mount adapted to rotatably hold a second wheel about a second rotational axis, the second wheel mount pivotally attached to the mounting plate so as to permit the mounting plate to tilt about the tilt axis;

a support member fixedly attached to the mounting plate, the support member disposed between the first and second wheel mounts and pivotally attached to both the first and second wheel mounts about a bore formed through the support member; and

a rod including a forward portion attached to the first wheel mount and a rear portion attached to the second wheel mount, the rod extending through the bore formed through the support member.

20. The system of claim **15** further comprising a spring member having a first end loosely attached to the mounting plate and a second end fixedly attached to the first wheel mount, the spring member configured to urge the mounting plate to the normal orientation when the mounting plate is tilted away from the normal orientation.

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