HIGH PERFORMANCE THREE-WHEELED SKATES

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ABSTRACT

The three-wheeled skates system employs a conventional boot as used in in-line skates to which is attached a frame from toe to heel supporting a single wheel at the toe and a spaced pair of wheels sharing a common axle at the heel, the wheels being of the same type used in in-line skates. A mechanical braking system uses a handgrip lever controlling a brake actuator lever by Bowden-type sheath and cables. The brake actuator lever rotates about an axle, which applies the pressure of attached brakes for speed control. The rear axle is confined in generally frustoconical elastomeric elements and held within receiving bores within the heel portion of the frame, allowing the boot to lean inward relative to the wheels during a turn. The cant of the boot is adjustable from a cruising angle to a speed angle by settings of the front wheel on the toe frame.
HIGH PERFORMANCE THREE-WHEELED SKATES

CROSS-REFERENCE TO RELATED APPLICATION

SUMMARY OF THE INVENTION

[0009] The three-wheeled skates of the present invention both provide a learning skate platform for advancement to in-line skates and a skate useful in itself for relaxing cruising and speed as desired. The three-wheeled skates of the present invention employ a conventional boot as used in in-line skates to which is attached from toe to heel a frame supporting a single wheel at the toe and a spaced pair of wheels sharing a common axle at the heel, the wheels being of the same type used in in-line skates. A mechanical braking system is provided using a handgrip lever controlling a brake actuator lever by means of Bowden type sheath and cables. The brake actuator lever rotates an axle, which applies the pressure of attached wheel-conforming friction brakes, thus controlling speed as desired by handgrip action of the skater. The rear axle is confined in generally frustoconical elastomeric elements and held thereby within conforming receiving bores within the heel portion of the frame, allowing the boot to lean inward relative to the axle and wheels upon executing a turn and thus providing for improved tracking of the wheels around the turn. The cant of the boot is adjustable from a cruising angle to a more canted speed angle by settings of the front wheel relative to the toe frame, thus allowing for relaxing cruising or speed skating.

[0010] It is an aspect of the invention to provide improved elements and arrangements thereof for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

[0011] These and other aspects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 is an environmental, perspective view of high-performance three-wheeled skates according to the present invention.

[0013] FIG. 2 is a side elevation view, partially cut away, of a skate as in FIG. 1 at touring setting.

[0014] FIG. 3 is a side elevation view of a skate as in FIG. 1 at speed setting.

[0015] FIG. 4 is a bottom view of a skate as in FIG. 1.

[0016] FIG. 5 is a lower exploded view of the frame, wheels, brake system and brake control system of a skate as in FIG. 1.

[0017] FIG. 6 is a detail view of the brake control system and support belt of the skate of FIG. 1.

[0018] Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] The present invention is a three-wheeled skate employing a conventional boot as used in in-line skates to which is attached from toe to heel a frame supporting a single wheel at the toe and a spaced pair of wheels sharing a common axle at the heel, the wheels being of the same type used in in-line skates. A mechanical braking system is provided using a handgrip lever controlling a brake actuator lever by means of Bowden type sheath and cables. The brake

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to roller skates. More particularly, the present invention relates to high-performance three-wheeled skates having hand-operated brakes.

[0004] 2. Description of the Related Art

[0005] The use of in-line skates is widespread, and capable of substantial speeds. They require, however, a learning period for their effective use and the learner is subject to repeated falls and resultant injuries. They also require a continuous level of attention, reducing their enjoyment when the skater desires to relax and cruise. The brakes are generally rubber wedge brakes mounted at the heel or toe that require substantial skill in their effective use. It would be desirable to provide a skate which is useful in the learning process of using high-performance skates while reducing the risk of falls and resulting injuries to the skater. It would also be desirable to provide a skate which is more relaxing for cruising, requiring less attention by the skater, while providing high performance capabilities when desired. It would also be desirable to provide effective braking which is effective under high-performance conditions and does not require the skater to lift a portion of a skate to use a conventional brake. Three-wheeled skates are known which provide the user with a relative safe means of learning to skate, however known three-wheeled skates are not capable of high-performance use and have marginal brake systems if at all. A three-wheeled skate is desired capable of high performance and providing a reliable and easily used brake system for use as a step toward proficiency in using in-line skates, and for cruising where constant attention to skating is not required. It would further be desirable if such a skate had high-performance capabilities and advanced cornering ability over known three-wheeled skates.

[0006] French Patent No. 2,556,228, published Jun. 14, 1985, describes three-wheeled roller skates whose wheels can be inclined laterally on turns in a manner that the weight of the user offsets the centrifugal force and allowing the user to turn while the skater’s sole remains parallel to the plane of the wheels.

[0007] German Patent No. 19,833,653, published Feb. 10, 2000, describes a three-wheeled roller skate having a support platform onto which is fixed a show support and having two front wheels on a common axle and a trailing rear wheel, the front wheels being fitted to a sub frame which pivots allowing the front wheels to adapt to ground contours and turns.

[0008] None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed. Thus three-wheeled skates solving the aforementioned problems is desired.
actuator lever rotates an axle, which applies the pressure of attached wheel-conforming friction brakes, thus controlling speed as desired by handgrip action of the skater.

[0020] Referring to FIG. 1, there is shown an environmental perspective view of the present inventive three-wheeled skates and braking system referred to generally by 10. The system 10 is worn by a skater S with three-wheeled skates 12 worn on legs L, the brake control system 14 being supported for operation near the skater’s hand H on his waist W.

[0021] Referring to FIGS. 2-5, there is shown a side elevation view, partially cut away, of the inventive skate and brake system in the crisscrossing configuration; a side elevation view of the inventive skate and brake system in the speed configuration; a bottom view of the inventive skate; and an exploded view of the inventive brakes, frame, and wheels of the inventive skate and brake system, respectively.

[0022] As best seen in FIG. 2, brake control system 14 includes hand lever system 16 having grip handle 18 and a hand lever 20 for actuating the brake system by squeezing together by the skater’s hand H. Hand lever 20 has a hand lever connection 22 and a pivot connection 30 for rotation relative to brake control body 24 as mounted on grip handle 18. A pair of brake body cable sheath connectors and stops 28 attach to Bowden-type actuating cables 32 which extend to respective skates 12 for operation of braking unit 34, as mounted on frame 36, in response to rotation of hand lever 20. Frame 36 is mounted on boot 38 between boot toe 40 and boot heel 42, attached along sole 43 and at toe plates 44 and heel plates 48. Toe plates 44 are attached to the toe portion of sole 43 by toe plate connectors 46, such as screws. Heel plates 48 are attached to the heel portion of sole 43 by heel plate connectors 50 such as screws.

[0023] Frame 36 has a toe portion 52 extending forward of and downward from boot toe 40. Front wheel 54 is mounted at toe portion 52 of frame 36, front wheel 54 being supported for rotation by front axle assembly 56. Toe portion 52 has two pairs of bores for mounting axe assembly 56, the first pair being cruising axle bores 58 as shown mounted in FIG. 2 and the second pair being speed axle bores 60 located above and to the rear of axle bores 58 as shown mounted in FIG. 3. An alternative configuration is shown in ghost lines in FIG. 5 where slots 61 take the place of axle bores 58 and 60, providing a range of adjustments between the cruising axle position and the speed axle position. Frame 36 has heel portions 64 to which heel plates 48 are attached.

[0024] As best seen in FIG. 4, frame 36 is made up of side members 66 as attached by frame cross members 90 which provide spacing for mounting front wheel 54 on axle assembly 56. The heel plates 48 of frame 36 as defined by side members 66 are elevated relative to toe plates 44 to provide a forward cam to boot 48.

[0025] As best seen in FIG. 2-4, rear axle assembly 70 is mounted on heel portion 64 of frame 36 and supports rear wheels 72 for rotation. Rear axle assembly 70 includes a rear axle 110 (see FIG. 5), elastomeric mountings 114, elastomeric mounting outer washers 116, elastomeric mounting inner washers 118 and rear axle central spacer 120, the wheels 72 being secured on rear axle 110 by threaded end cap nuts 122. Braking unit 34 is actuated by cable 76, which extends beyond sheath connector 74 mounted through the sole 43 of boot 38. Brake shoes 78 conform to rear wheels 72 and are rotated to frictionally engage rear wheels 72, respectively, for speed control by braking unit 34.

[0026] As best seen in FIGS. 2 and 4, brake shoes 78 are attached at opposing ends of actuating lever axle and brake shoe connector 82 upon which brake actuating lever 80 rotates in receiver bores 134 (see FIG. 5) of frame side members 66. Cable 76 is attached to brake actuating lever 80 at cable attachment 86. Retraction of cable 76 rotates axle 82, forcing brake shoes 78 against rear wheels 72 to accomplish the braking action of braking unit 34. Brake release spring 84 is a tension coil spring attached between lever spring attachment 87 and hooked over spring anchor bar 88 extending between frame side members 66. Spring 84 is wrapped around the lower portion of lever axle 82 such that, upon retraction of cable 76, tension spring 84 is extended, pulling against rotation braking rotation of lever 80. Upon release of cable 76, as controlled by brake control system 14 in the hand of skater S, tension spring 84 pulls braking lever 80 downward, pulling cable 76 downward and rotating brake shoes 78 away from engagement with rear wheels 72, freeing them to rotate freely. Braking power may be varied for desired rates of slowing or resistance to accelerating (downhill) by varying the force of the squeezing pressure on the handgrip and hand lever of the brake control system 14.

[0027] Frame side members 66 are connected by frame cross members 90 to frame 36. Frame cross members included threaded post 92, spacer cylinder 94, and threaded cap nuts 96, threaded post 92 extending through cross member receiving bores 98 (see FIG. 5) and secured by threaded cap nuts 96. Spring anchor bar 88 is a spacer cylinder mounted by anchor bar threaded post 124 extending through anchor post receiving bores 128 in frame side members 66 and secured by anchor bar threaded end cap nuts 126.

[0028] As described above, rear axle assembly 70 includes a rear axle 110 (see FIG. 5), frustoconical shaped elastomeric mountings 114, elastomeric mounting outer washers 116, elastomeric mounting inner washers 118 and rear axle central spacer 120 the wheels 72 being secured on rear axle 110 by threaded end cap nuts 122. As seen in FIGS. 4 and 5, axle assembly 70 is mounted between frame side members through rear axle bores which fit over the tapered outer walls of respective elastomeric mountings 114. When the skater S turns into a curve, the elastomeric mountings 114 allow frame 36 and thereby the boot 38 to lean into the curve, while rear wheels 72 remain on the skating surface, providing skater S with improved balance and traction during execution of the curve.

[0029] Referring to FIG. 6, there is shown a detailed view of the brake control system and belt of FIG. 1. As described above, brake control system 14 includes a grip device having a hand grip 18 and a hand lever 20 mounted on brake control body 24 having brake body cable sheath connectors and stops 28 for operation of the Bowden-type cables 32. Belt 150 having buckle 152 is conveniently worn around the waist W of a skater S, belt 150 having a spring-type holster 154 which holds grip 18 when not in use. The grip 18 is conveniently held within the easy grasp of the skater’s hand H for removal from the holster 154 for application of the brakes during skating. Cable guide 156 is conveniently
mounted on belt 150 by fasteners 158 for keeping Bowden cables 32 close to the body to avoid snagging on limbs or structures during skating.

[0030] It is understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

We claim:

1. A three-wheeled skate system, comprising:

   a pair of boots, each of the boots having a sole defining a toe and a heel;

   an elongated frame extending along each of the soles, each of the frames having a toe plate and a heel plate attached to the toe and the heel, respectively, of the corresponding boot, each of the frames having spaced side members extending the length thereof and forming a respective toe portion and a heel portion, the toe portions extending downward from, and forward of, each of the toes of the boots, respectively;

   a front wheel axle assembly mounted on the toe portion of each of the frames, respectively, each of the axle assemblies having a front wheel mounted for rotation therein between the spaced side members of the boots;

   a rear wheel axle assembly mounted on the heel portion of each of the frames, respectively, each of the rear wheel assemblies having a pair of rear wheels mounted for rotation therein outside the spaced side members of the frame;

   a brake unit attached to each of the frames, respectively, each of the brake units having a pair of brake shoes mounted for selective frictional engagement with each of the rear wheels, respectively, and

   a brake control system connected to each of the brake units, respectively, each of the brake control systems having:

   a handgrip;

   a lever pivotally attached to the handgrip, the lever pivoting between a brake release position and a brake engaged position; and

   a pair of Bowden cables extending between the lever and the brake unit, the cables acting to selectively engage the brake shoes with the rear wheels in order to control rotation of the wheels in response to pivoting the lever relative to the handgrip.

2. The three-wheeled skate system according to claim 1, wherein the toe portion of each of said frames has first and second pairs of axle-receiving bores defined therein, the second pair of axle-receiving bores being located above and to the rear of the first pair of axle-receiving bores, said front axle assemblies being selectively mounted in the first pair of axle-receiving bores for cruising style of skating, and being selectively mounted in the second pair of axle-receiving bores for speed skating, forward cant of said boots being increased when the front axle assemblies are mounted in the second pair of axle-receiving bores.

3. The three-wheeled skate system according to claim 1, further including a belt adapted for being worn about a user’s waist, the belt having:

   a buckle mounted on one end of the belt for adjusting to the waist size of the user;

   a holster mounted on the belt for holding said handgrip when not in use; and

   a cable guide mounted on the belt for keeping said Bowden cables close to the user’s body in order to avoid snagging said cables on limbs and structures during skating.

4. The three-wheeled skate system according to claim 1, wherein each of said rear axle assemblies is mounted through and between said frame side members, respectively, each of said rear axle assemblies further comprising:

   a rear axle, said pair of rear wheels being mounted on the rear axle on the outside of said frame side members;

   elastomeric mounting outer washers disposed on the rear axle between each of said rear wheels and each said frame side member;

   elastomeric mountings disposed on the rear axle between each of said elastomeric mounting outer washers and each said frame side member;

   elastomeric mounting inner washers disposed on the rear axle between said frame side members; and

   a rear axle central spacer disposed on said rear axle between each of said elastomeric mounting inner washers;

   wherein the elastomeric mountings permit said frames and said boots to lean into a curve while said rear wheels remain on a skating surface, thereby providing a user with improved balance and traction during execution of a curve.

5. The three-wheeled skate system according to claim 4, wherein the heel portion of each of the side members of said frames have rear axle bores defined therein, said elastomeric mountings being generally frustoconical in shape and being held within the rear axle bores.

6. The three-wheeled skate system according to claim 1, wherein said brake unit further comprises:

   a lever axle mounted for rotation between the side members of said frame, said brake shoes being mounted on opposite ends of the lever axle;

   a brake shoe lever fixed to, and extending normal from, the lever axle for rotation therewith, one of said pair of Bowden cables being attached to the brake shoe lever;

   a spring anchor bar extending between the side members of said frame; and

   a brake spring having a first end attached to the spring anchor bar and a second end attached to the brake shoe lever, the brake spring biasing said brake shoes away from contact with said rear wheels when the brake unit lever is in the brake release position.

7. A three-wheeled skate, comprising:

   a boot having a sole defining a toe and a heel;

   an elongated frame extending along said sole and having a toe plate and a heel plate attached to said toe and said heel, respectively;
said elongated frame having spaced side members extending the length thereof and forming a respective toe portion and a heel portion;
said toe portions extending downward from and forward of said toe of said boot;
a front wheel axle assembly and a front wheel;
said toe portion supporting said front wheel axle assembly supporting said front wheel mounted for rotation between said spaced side members at a point downward from and forward of said toe of said boot;
a rear wheel axle assembly and a pair of rear wheels;
said heel portion respectively supporting said rear wheel axle assembly supporting said pair of rear wheels mounted for rotation on respective outer sides of said spaced side members of said frame;
a brake unit attached to said frame having a pair of brake shoes mounted for selective frictional engagement with said pair of rear wheels; and,
a brake control system comprising a lever and a grip device acting on a Bowden cable, said cable extending to said brake unit and acting to selectively engage said brake shoes with said rear wheels so as to control rotation of said wheels in response to rotating said lever relative to said grip device.
8. The three-wheeled skate according to claim 7, further comprising:
first and second pairs of axle receiving bores located in said toe portions of said front frames, respectively, each said second pair of axle receiving bores being located above and to the rear of respective said first pair of axle receiving bores, said front axle assembly being selectively mounted in said first pair of axle receiving bores for cruising style of skating and in said second pair of axle receiving bores, thereby increasing the forward cant of said respective bores for speed skating.
9. The three-wheeled skate according to claim 7, wherein said rear axle assembly is mounted through and between said frame side members, said rear axle assembly further comprising:
a rear axle for mounting said pair of rear wheels on the outside of each of said frame side members;
elastomeric mounting outer washers on said rear axle between each of said rear wheels and said frame side members;
elastomeric mountings on said rear axle between each of said elastomeric mounting outer washers and the outside of each of said frame side members;
elastomeric mounting inner washers on said rear axle adjacent to the inside of each of said frame side members; and,
a rear axle central spacer on said rear axle between each of said elastomeric mounting inner washers between the inside of each of said frame side members;
wherein said elastomeric mountings allow said frame and said boot to lean into a curve while said rear wheels remain on a skating surface providing a user with improved balance and traction during execution of a curve.
10. The three-wheeled skate according to claim 9, wherein said elastomeric mountings are generally frustoconical in shape and are held within conforming receiving bores in said heel portion of said frame side members.
11. The three-wheeled skate according to claim 7, wherein said 2 brake unit further comprises:
a brake-actuating lever connected to one of said pair of Bowden cables;
an actuating lever axle connected to and allowing rotation of said brake actuating lever;
a brake shoe connector for fixedly connecting said pair of brake shoes to each other to respond to rotation of said actuating lever axle; and,
a brake release spring attached between said brake actuating lever and a spring anchor bar extending between said heel portion of said frame side members;
whereupon when said Bowden cable is released, said brake release spring is extended, rotating said brake-actuating lever and said brake shoes away from engagement with said rear wheels allowing them to rotate freely.
12. The three-wheeled skate according to claim 11, wherein said actuating lever axle and said brake shoe connector are one in the same.
13. The three-wheeled skate according to claim 7, further comprising a sheath connection mounted through said sole of said boot for receiving said cable to connect to said brake unit.

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