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Palermo

(54) SKATEBOARD WHEEL MODIFICATION APPARATUS

(76) Inventor: **Joseph Palermo**, Hillsdale, NY (US)

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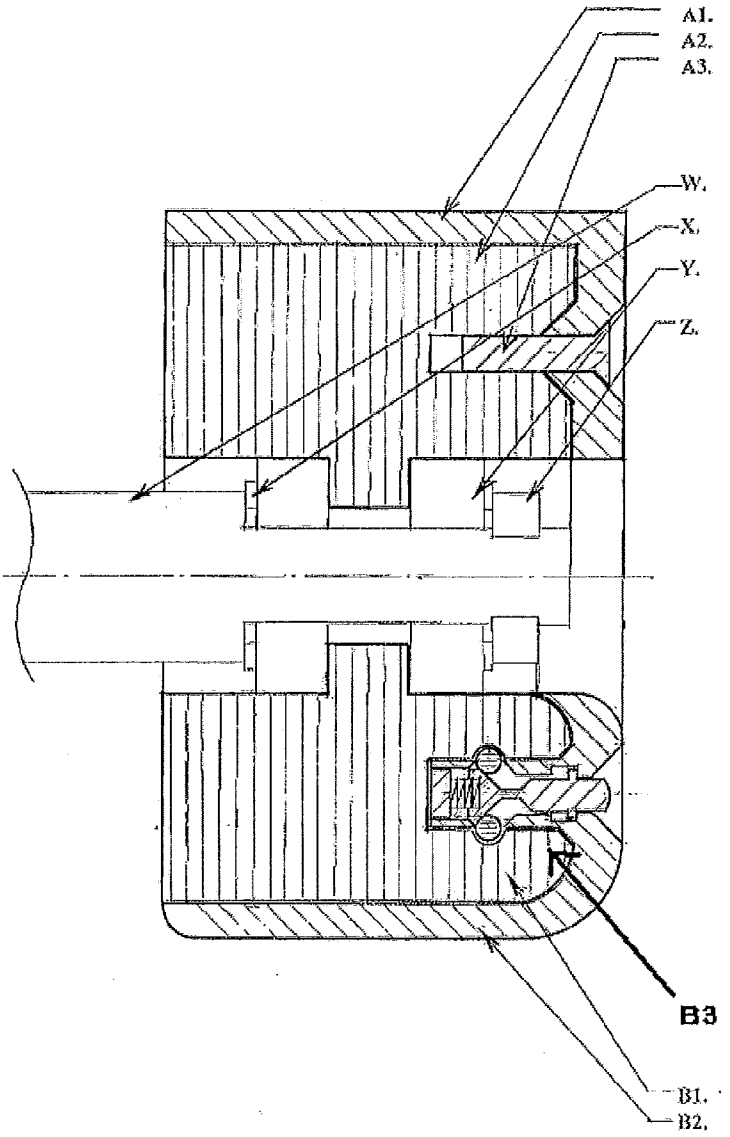
(52) **U.S. Cl.** **301/5.301**

(57) **ABSTRACT**

The present invention concerns a method and apparatus for the securing a secondary outer wheel surface to a primary skateboard wheel so as to change the performance characteristics of said skateboard. The apparatus is further directed to allowing a user to remove or secure said second wheel without the use of customized tools or devices. The present invention is also directed to securing a secondary wheel surface in a manner that prevents the primary wheel from impeding the motions of the skateboard. Through the use of the present invention, a user can customize the performance characteristics of the skateboard without the necessity of replacing wheels



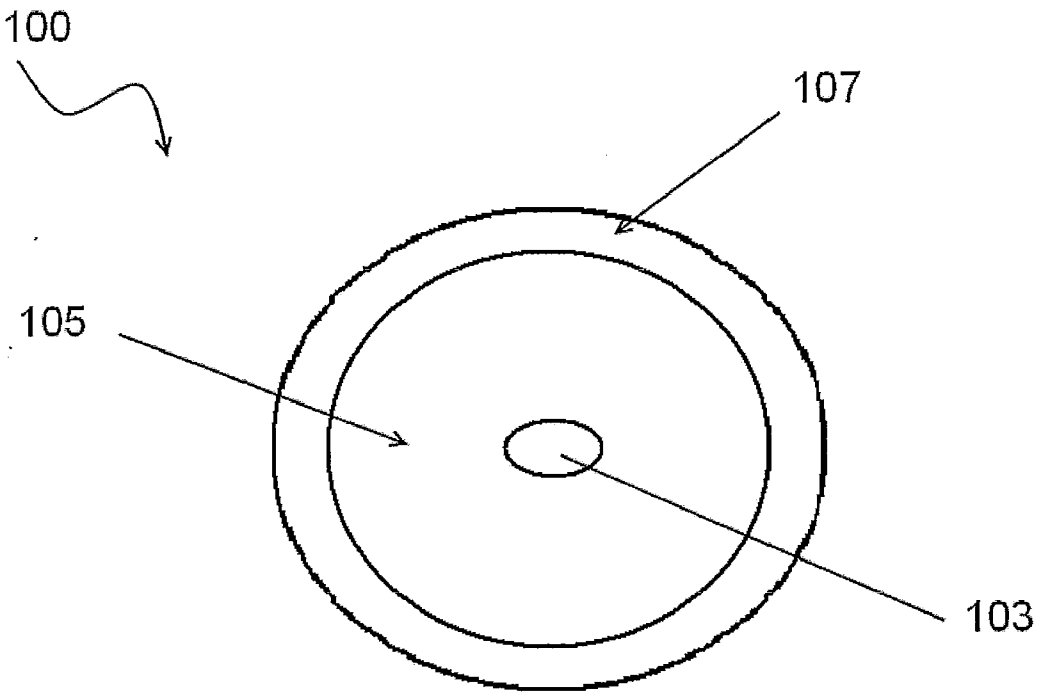


FIG 1

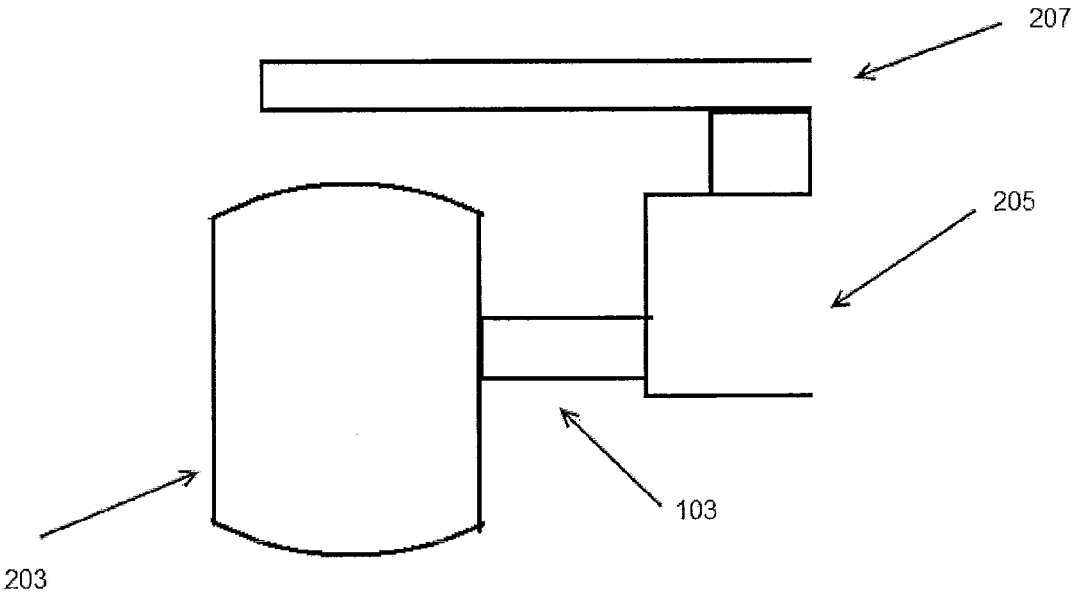


FIG 2

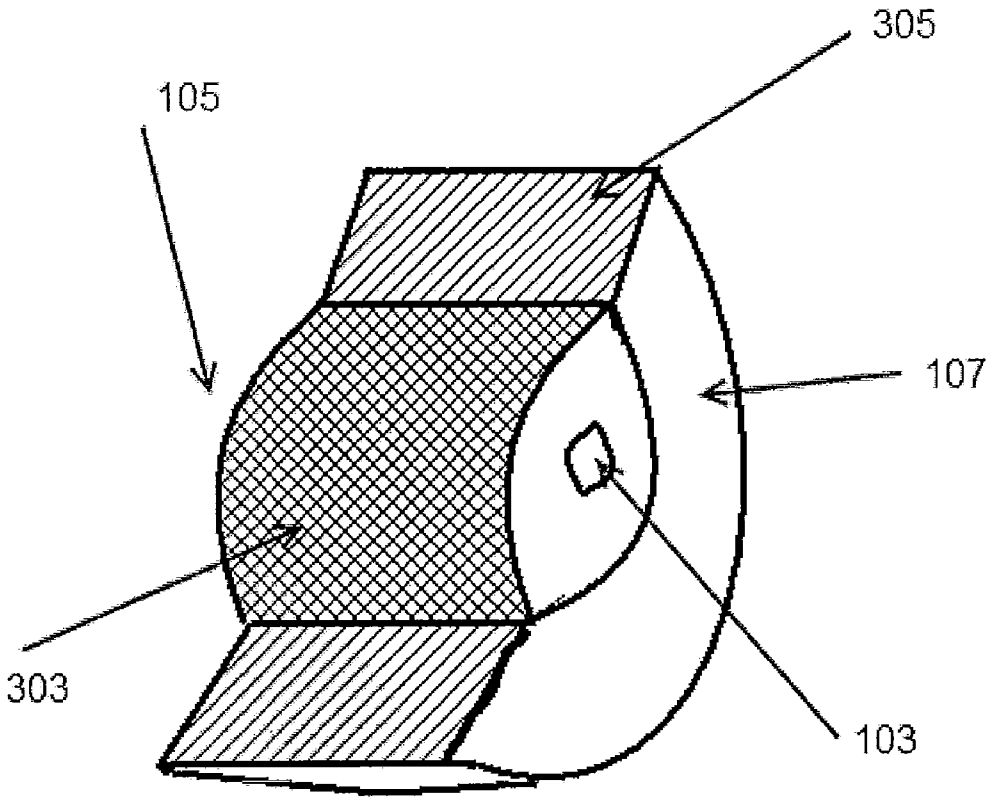


FIG 3

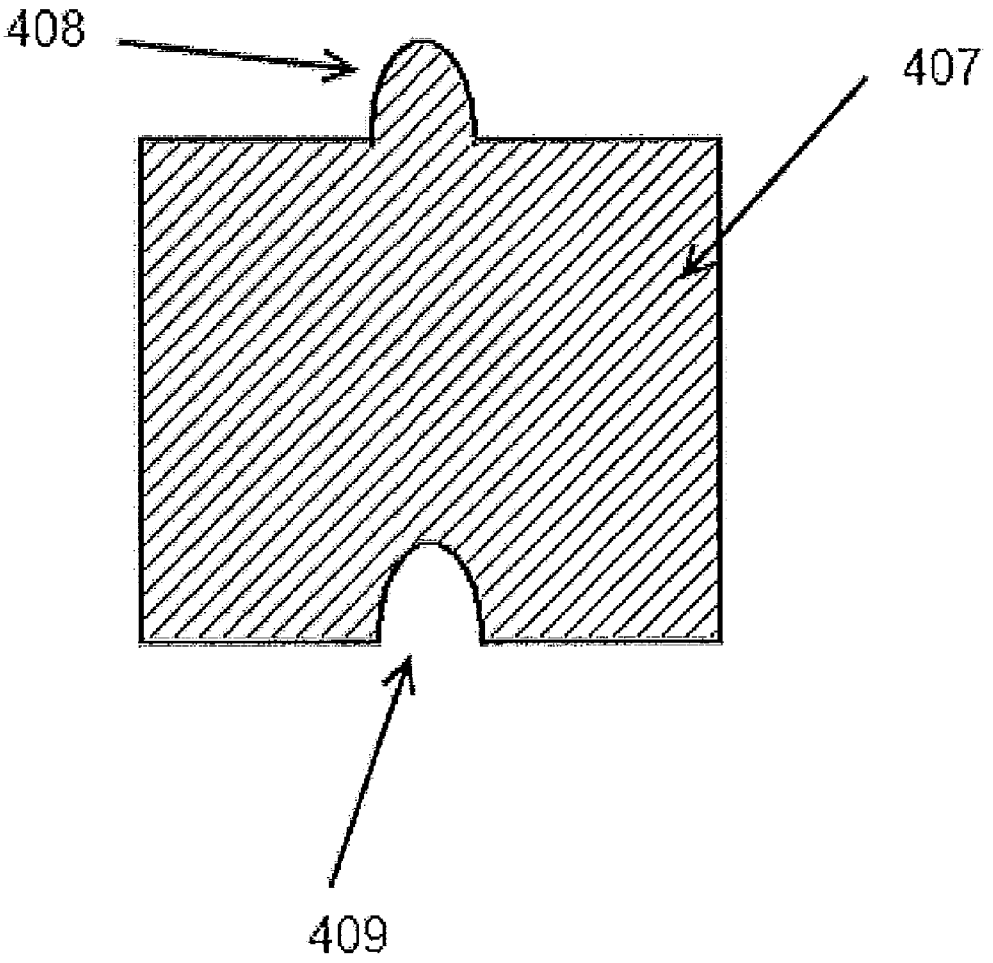


FIG 4

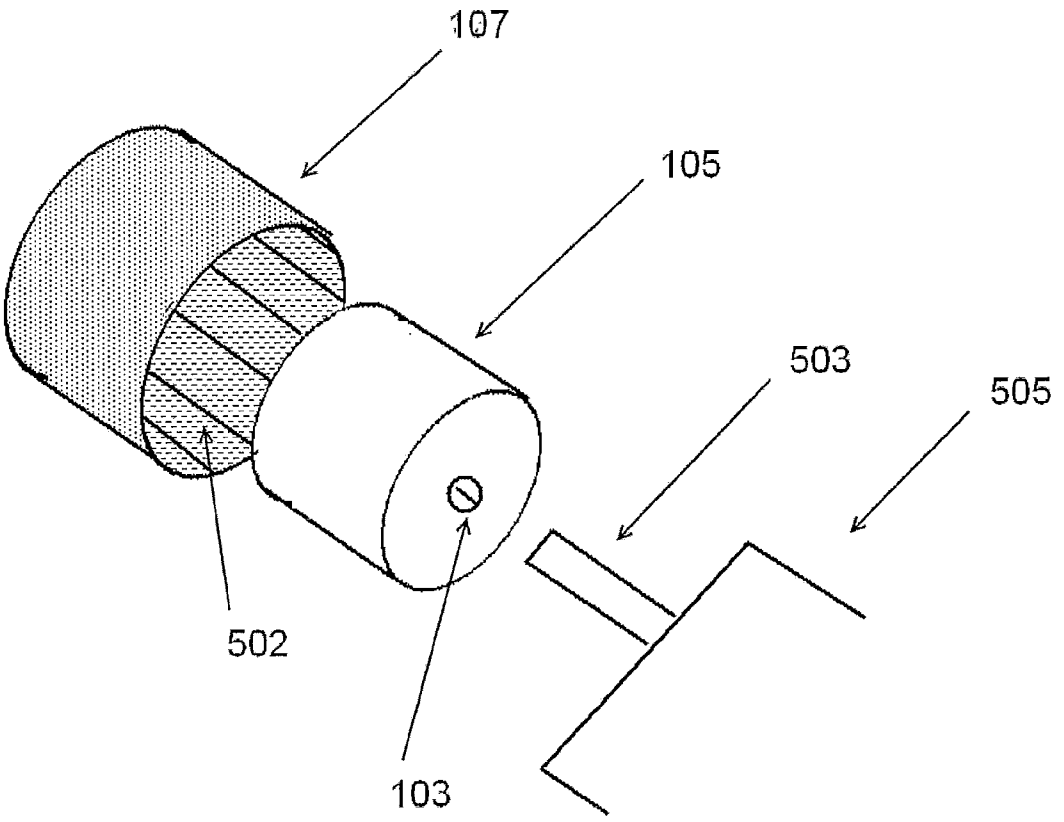


FIG 5

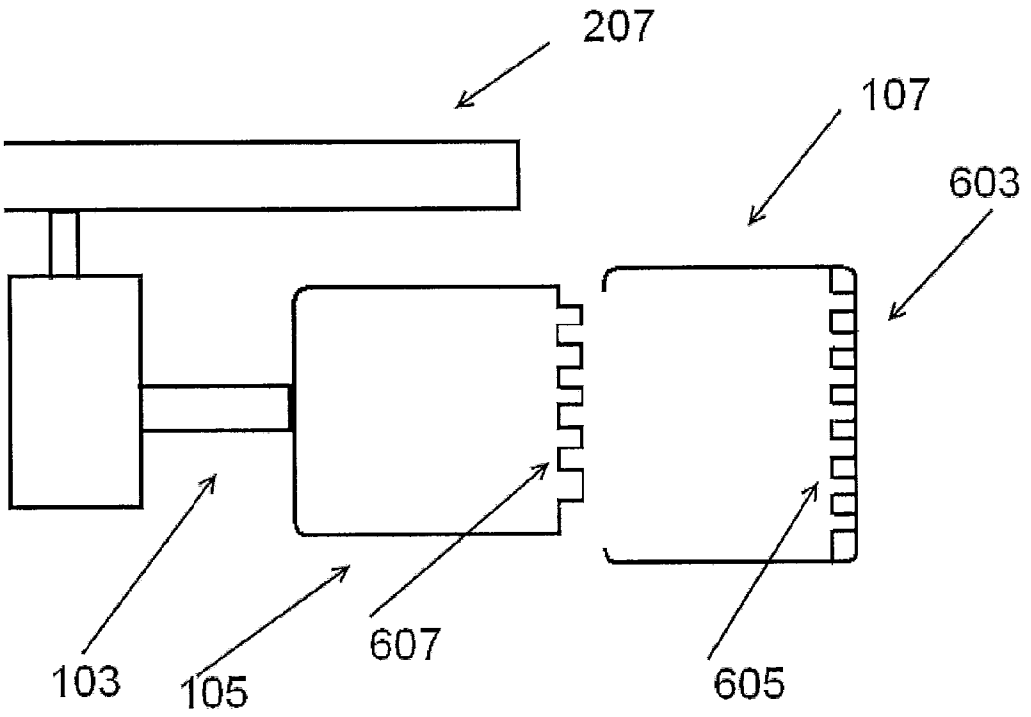


FIG 6

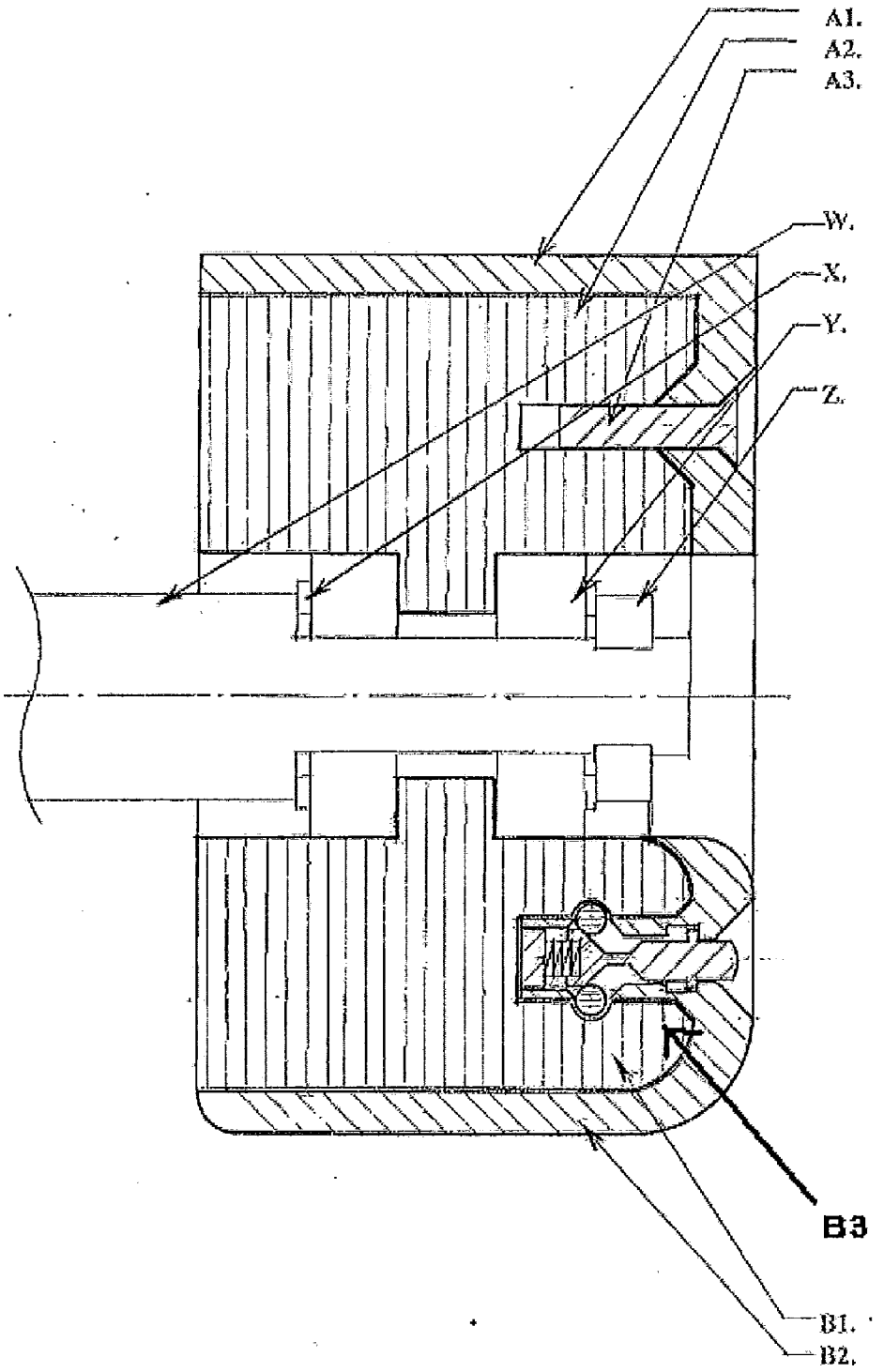


FIG. 7A

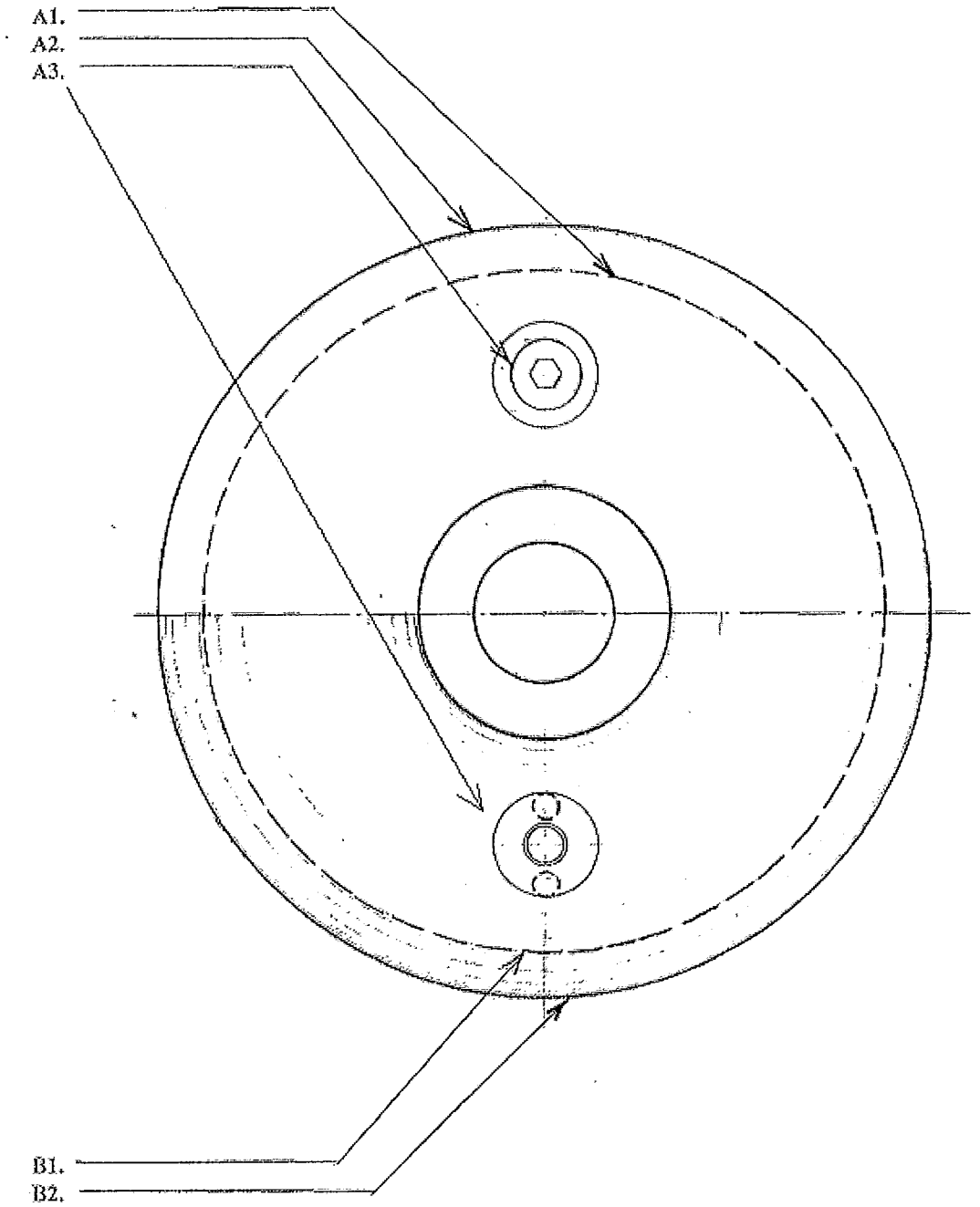


FIG. 7B

SKATEBOARD WHEEL MODIFICATION APPARATUS

RELATED APPLICATIONS

[0001] This application claims the benefit of priority to co-pending provisional patent application 61/511,622, which was filed Jul. 26, 2011 under 35 U.S.C. 119(e), herein incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to apparatus and method for changing the performance characteristics of skateboard and other personal transport devices.

[0004] 2. Discussion of the Related Art

[0005] Skateboards, their wheels and associated accessories, are all know in the art. Skateboard wheels generally are of solid construction and do not incorporate inflatable tires, rims, or other accents that have an analogue in general wheel construction. It has been known in the art to fabricate skateboard wheels from different types of material. For example, semi-hard rubber materials provide a comfortable, shock-absorbing wheel structure and a relatively high coefficient of friction in contact with the ground. This friction with the ground enables the skateboard to provide a user with a high degree of traction on most surfaces. A high friction co-efficient allows for the user to perform a variety of acrobatic and technical performances and maneuvers, such as jumps over obstacles and slides on angled surfaces (colloquially known as olies, kick-flips, grinds and the like) to be undertaken. However, it should be noted that rubber wheels have drawbacks. While the high friction co-efficient is suitable for acrobatic maneuvers, it decreases absolute wheel rotation speed. As such, a skateboard equipped with purely rubber wheels is a poor transport vehicle, Those seeking to use a skateboard in a transport capacity are in need of different wheel characteristics.

[0006] Alternatively, it is known in the art to fabricate the skateboard wheels from solid plastics such as urethane. Wheels constructed of urethane have a relatively low co-efficient of friction with a variety of ground surfaces. As such they are very popular for street and road traveling skateboards, i.e longboards. However, this relatively low coefficient of friction results in low side and lateral traction. As a result, lateral slippage, drifting, and sliding are all common occurrences. As such, proper control and maneuvering of a skateboard becomes difficult on road surfaces at high speed.

[0007] It is known in the prior art to attempt to combine these two different wheel types into a single wheel. However, numerous drawbacks have resulted. Due to the differing compositions of urethane and rubber, bonding and adhesive agents are necessary to join the two materials together. The result is that the bonding fails and the wheels begin to separate into their constituent parts.

[0008] Another problem inherent in the joining of materials is that the ground contacting portion of the wheel extends the entire distance of the overall width of the wheel, there being defined essentially as a right angle at the inner and outer peripheral edges of the ground contacting portion with opposite faces of the wheel. As such, transition of a skateboard user from one position to another, whilst upon the board, induces very small acute angle deflection of the wheel surface from the ground. Therefore, when shifting weight, especially when cornering, the wheel surface is no longer parallel to the direction of motion of the skateboard. When this occurs, damage in the form of wheel chipping and uneven wearing of the urethane and/or rubber materials, is the result. Such shifting, in case of rubber results in rapid deformation and deterioration of the road contacting surface.

[0009] Therefore, what is needed in a system for skateboards and other wheeled recreational products which corrects these deficiencies and provides for a durable, long lasting and stable sporting device that has improved performance characteristics across a spectrum of road surfaces.

SUMMARY OF THE INVENTION

[0010] The present invention is directed to wheel apparatus for a skateboard that allows the selection of wheels with the proper characteristics relative to the proposed activity. More specifically, the present invention is directed to an interchangeable wheel apparatus that allows the operator of a skate board, without tools, to swap wheel types, depending on the circumstances.

[0011] In an illustrative embodiment of the present invention, the system has a base board wherein two center point wheel axels, or trucks, are affixed to the bottom, in standard skateboard configuration. Those skilled in the art would appreciate that any standard or custom skateboard truck can be used with the present invention herein described. Furthermore, any standard or custom skateboard platform, or deck, is suitable for the use with the system of the present invention. Affixed to each end of each axel of the skateboard are a set of coefficient of friction modifiable wheels. A first wheel is affixed to the axel of the truck, said wheel is constructed out of material having a low coefficient of friction. Additionally, this first wheel is constructed of a material with a sufficiently high durometer value, such that it is suitable for performing acrobatic maneuvers. The present invention also includes a secondary wheel. The secondary wheel is formed as a torus, without material intersecting the center of the wheel. This secondary wheel can be placed over the first wheel, and secured in a manner that prevents the first wheel from turning independently of the second wheel. The secondary wheel is formed out of a material having a higher coefficient of friction than the first wheel. The present invention is also directed to a method of affixing and removing the secondary wheels without the necessity of tools. In an illustrative embodiment of the present invention, the secondary wheel is formed of a flexible material that can easily be stretched to surround and cover the first wheel. The elasticity and resiliency of the flexible material allows for the secondary wheel to transfer its rotational motion to the primary wheel. In this manner, a composite wheel is provided that allows for selecting different wheel characteristics depending on the road conditions.

[0012] It is further envisioned that the both wheels herein described are capable of being changed without the use of tools. As an illustrative example, the present invention provides for a flexible secondary wheel that has an inner surface that has a very high coefficient of friction, and an outer surface having a lower coefficient of friction. As a result, the secondary wheel will, when engaged on a road surface, will transfer the rotational motion to the primary wheel. Additionally, the present invention provides for a secondary wheel that can attach to the primary wheel by a variety of mechanisms, such as tongue and groove latches and screw-thread designs.

[0013] Another aspect of the present invention is to provide a wheel surface that is adapted to a particular activity such as street racing, or acrobatic tricks. The present invention provide for an outer peripheral edge of the wheel that allows greater lateral movement control when combined with low coefficient of friction devices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The foregoing and other features of the present invention will be more readily apparent from the following detailed description and drawings of illustrative embodiments of the invention in which list the drawings and their captions. For example:

[0015] FIG. **1** is an illustrative side view of an embodiment of the invention;

[0016] FIG. **2** is an illustrative front view of the embodiment of the invention;

[0017] FIG. **3** is an illustrative cut-away view of elements of the invention as disclosed in FIG. **1**.

[0018] FIG. **4** is an illustrative top view of one of the embodiments the present invention;

[0019] FIG. **5** is an illustrative exploded view of one of the embodiments of the present invention;

[0020] FIG. **6**, is an illustrative side view of one of the embodiments of the present invention.

[0021] FIG. **7**A, is an illustrative side view of one of the embodiments of the present invention.

[0022] FIG. **7**B, is an illustrative front view of one of the embodiments of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0023] By way of overview and introduction, the present invention concerns a method and apparatus for the securing a secondary outer wheel surface to a primary skateboard wheel so as to change the performance characteristics of said skateboard. The apparatus is further directed to allowing a user to remove or secure said second wheel without the use of customized tools or devices. Lastly, the present invention allows for the securing of a secondary wheel surface in a manner that prevents the primary wheel from impeding the motions of the skateboard.

[0024] As seen in FIG. **1**, the present invention provides for a composite skate board wheel **100**. The composite skateboard wheel is configured to have a securing axel **103**, provided to secure the composite wheel to the remainder of the skateboard apparatus (not shown). The securing axel **103** is attached to the primary wheel **105**. This is accomplished by threading the axel through a center portion of the primary wheel and affixing a cap or screw. In this way, the primary wheel **105** is secured to the axel and is prevented from slipping or moving when engaged with a road surface. Furthermore, the axel is provided so that the primary wheel may rotate freely around it with or without the aid of lubricants or bearings.

[0025] The primary wheel **105** is constructed out of standard materials that are suitable for the functions of a skateboard. The primary skateboard wheel in a particular embodiment of the present invention is formed of urethane or another material having a low-coefficient of friction. The primary wheel is also configured to be constructed of a material having a high level of hardness, specifically, a high duramoeter value. The wheel is further configured and designed so that it functions as a park environment skateboard. That is, the low coefficient of friction allows for the primary wheels, and associated skateboard platform to achieve the necessary lateral movement and directional slippage necessary to perform tricks and acrobatic maneuvers.

[0026] As shown in FIG. **2**, the present invention also includes the secondary wheel surface **107**. The secondary wheel surface **107** is adapted to fit over the primary wheel **105**. As shown in FIG. **1**, the secondary wheel surface is configured to completely enclose any road contacting surfaces presented by the primary wheel. In addition, the secondary wheel surface is adapted so as not to overlap the sides **203** of the primary wheel. In this manner, the primary wheel and its attachment to the axel **103** is not interfered with. In an embodiment of the present invention, the secondary wheel surface provides a different road surface material; thereby allowing the skateboard to alter its performance characteristics. Specifically, the secondary wheel is configured to have lower durometer value than the primary wheel. This allows the secondary wheel to function as a general purpose road transport device. In an alternative embodiment, the primary wheel is further configured so as to minimize lateral slippage while in motion. In said embodiment, it is possible to provide for a wheel composition that has been selected to provide sufficient co-efficient of friction so as to allow for lateral stability while traveling. Additionally, a further alternative embodiment provides the secondary wheel construed of a composite material that is a blending of high and low-coefficient of friction wheels. Wherein the outer portion of the wheel possesses a surface material having a high coefficient of friction. In this way, cornering the skateboard becomes less risky due to a reduction in lateral slippage. Conversely, when a user is traveling on a straight path and centered over the skateboard, the low-coefficient road surface is primarily engaged, thereby allowing for maximal speed attainment. Additionally, the secondary wheel **107** is configured to not interfere with the skateboard riding platform/deck **207** or the axel management system/truck **205**.

[0027] As shown in FIG. **3**, the inner wheel **105** and the outer wheel **107** are in direct contact when in use. In a particular embodiment of the present invention, it is provided that the exterior texture of the primary wheel outer surface **303** is such that it provides natural resistance to the inner secondary wheel surface **305**, such that the inner wheel **105** is prevented from spinning independently of the secondary wheel **107**, when the wheel is engaged on a road surface.

[0028] As shown in FIG. **4**, the secondary wheel surface, can be configured as a flat piece of material **407**, having the desired material characteristics of a wheel with high-coefficient of friction. The flat secondary wheel material **407** can be affixed to the primary wheel **105** by wrapping the material around the primary wheel. In the disclosed embodiment, the secondary wheel material possesses a slot and tab configuration. This configuration allows the tab **408** to be inserted into slot **409**. Through this securing action, the material is affixed to the primary wheel surface through tension. Therefore, the secondary wheel is prevented from moving or slipping off of the primary wheel. Those skilled in the art are aware of the various styles and types of securing devices that could replace the tab and slot elements depicted in FIG. **4**. The present invention is in no way limited to those elements, or dimensions of the secondary wheel as depicted. For example, another embodiment of the present invention provides an alternating series of tabs and slots, so as to provide a greater surface area between the two ends of the secondary wheel material. The present invention also provides for the secondary wheel material to have a given thickness depending on the specific characteristic sought to be conveyed to the skateboard. For example, the present invention is configured to form the secondary wheel out of a rubber or other high friction co-efficient material. In this instance, it is preferable to provide a thicker material, so as to allow for sufficient cushioning and give during operation. However, it is envisioned that the secondary material might in fact be provided with a co-efficient of friction that is less than that of the primary wheel. In this configuration, it is preferable to have a thin secondary wheel material.

[0029] In an alternative embodiment, as shown in FIG. **5**, the secondary wheel surface can be pre-formed in the shape of a cup or cylinder. In this embodiment, the pre-formed secondary wheel surface **107** fits over and is secured onto the primary wheel **105**. In the preferred embodiment the secondary wheel **107** is secured by mounting a tab or pin (not shown) into the axel portion of the primary wheel. This attachment, when combined with suitable high friction material located within the inner surface **502** of the secondary wheel **107** provides sufficient friction and stability to prevent the primary wheel **105** and secondary wheel **107** from moving in an asynchronous manner. In an alternative embodiment, the secondary wheel is formed of two or more separate pre-formed pieces that fit, snap or screw together so as to provide the proper coupling with the primary wheel.

[0030] In still a further embodiment of the present invention, as shown in FIG. **6**, the secondary wheel surface is formed as a cylinder **603** closed at one end. The inner surface of the closed end is provided with a series of protrusions and/or voids **605**, forming a saw tooth or square pattern, of teeth or gears. In this embodiment, the primary wheel **105** also possesses protrusions and/or voids **607** along a non-road surface contacting portion of the wheel. The protrusions of both the primary and secondary wheels are configured to interlock with one another. In this manner, the primary wheel and secondary wheel are prevented of rotating independently of one another.

[0031] In still a further embodiment of the present invention, as shown in FIGS. **7**A and B, the secondary wheel surface is formed as a cylinder A**1** closed at one end. The secondary wheel surface A**1** is coupled to the primary wheel A**2** surface by ball quick release fasteners A**3**, B**3** forming a unified structure. Upon depression of the fastener, the leaf springs of the fastener are no longer are engaged to the sides of the primary wheel A**2** and the secondary wheel A**1** is removed. In this embodiment, the primary wheel A**2**, B**2** is affixed to a truck axel (W) with the use of washers (X), bearings (Y) and a securing nut (Z). In this manner, the primary wheel and secondary wheel are prevented of rotating independently of one another.

[0032] The primary and secondary wheels herein described are envisioned as formed of synthetic materials such as natural, composite and or synthetic elastic or non-elastic compounds having a range of friction coefficients durometer qualities. However, those skilled in the art would appreciate that the primary and secondary wheel structures here in defined can be formed of any material, natural or synthetic that is capable of accomplishing the functions and designs herein described.

[0033] The present invention is also directed to the steps of selecting a proper secondary wheel given the expected surface conditions, removing any previously affixed wheel, affixing the desired secondary wheel surface, and engaging the road surface. It is envisioned that the given steps in the described method can be operated out of the order presented. Furthermore, additional step comprising of further actions within the described steps are contemplated. For instance, the step of affixing the secondary wheel covering includes a sub-step of wrapping the secondary wheel surface around the primary wheel surface and engaging a locking mechanism.

[0034] It should be understood that various combination, alternatives and modifications of the present invention could be devised by those skilled in the art. The present invention is intended to embrace all such alternatives, modifications and variances that fall within the scope of the appended claims.

[0035] While the invention has been particularly shown and described with reference to a preferred embodiment thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A wheel modification apparatus for use in personal transport devices, said apparatus comprising:
- a primary wheel having a ground contact surface and center body portion configured to accept an axel; and
- a wheel covering, having an inner and an outer surface, the inner surface selectively engagable to the ground contact surface of the primary wheel and the outer surface configured to provide different performance characteristics than the ground contact surface of the primary wheel.

2. The wheel modification apparatus of claim **1** wherein;
the wheel covering is formed of an elastic material.

3. The wheel modification apparatus of claim **1** wherein;
the wheel covering is formed of an resilient material

4. The wheel modification apparatus of claim **1** wherein;
the wheel covering is further configured to be selectively engaged to the ground contact portion of the wheel so as to not obstruct access to the center body portion of the wheel and axel.

5. The wheel modification apparatus of claim **3** wherein;
the primary wheel and wheel covering are selectively engaged so as to allow access to the axel.

6. The wheel modification apparatus of claim **1** wherein;
The primary wheel contact surface has a coefficient of friction value that is lower than a coefficient of friction value of the outer surface of the wheel covering.

7. The wheel modification apparatus of claim **1** wherein;
The inner surface of the wheel covering is configured to arrest the movement of the primary wheel contact surface independently of the wheel covering.

8. The wheel modification apparatus of claim **1** wherein;
The primary wheel ground contact surface has a durometer value that is greater than a durometer value of the outer surface wheel covering surface.

9. The wheel modification apparatus of claim **1** wherein;
the wheel covering is further configured to be formed of at least two hemispherical portions, each of said portions are configured to connect to one another so as to completely envelop the ground contact surface of the primary wheel.

10. A method of changing the performance characteristics of a ground contact surface of a personal transport device having a wheel selectively coupled to an axel, with a wheel surface covering comprising the steps of:
- selecting a wheel covering having desired performance characteristic that differs from the performance characteristic of the primary wheel of the personal transport device;
- securing the wheel surface covering having different performance characteristics than the wheel to the surface of the wheel.

11. A method of changing the performance characteristics of a ground contact surface of the primary wheel of claim **10**, further comprising the steps of:
- wrapping the wheel covering formed of elastic material around a circumference of the of primary wheel.

12. A method of changing the performance characteristics of a ground contact surface of the wheel of claim **10**, further comprising the steps of:
- inserting the primary wheel into the wheel covering, wherein the wheel covering is formed of a resilient material.

* * * * *