[0014] FIG. 6A shows a perspective view of the longboard deck in accordance with embodiments of the present invention;

[0015] FIG. 6B shows a perspective view of another longboard deck in accordance with embodiments of the present invention;

[0016] FIG. 7A shows a side view of a longboard deck with structural members in accordance with embodiments of the present invention;

[0017] FIG. 7B shows a bottom view of a longboard deck in accordance with embodiments of the present invention.

[0018] FIG. 7C shows a perspective view of the structural members in accordance with embodiments of the present invention;

[0019] FIG. 7D shows a side view of the structural members in accordance with embodiments of the present invention;

[0020] FIG. 8 shows a rear view of longboard decks with variable lengths in accordance with embodiments of the present invention.

Summary of the Invention

[0021] The following presents a simplified summary of one or more aspects in order to provide a basic understanding of such aspects. This summary is not an extensive overview of all contemplated aspects, and is intended to neither identify key or critical elements of all aspects nor delineate the scope of any or all aspects. Its sole purpose is to present some concepts of one or more aspects in a simplified form as a prelude to the more detailed description that is presented later.

[0022] According to a first aspect of the present disclosure, there is provided a longboard comprising a longboard deck including a front truck and a rear truck, wherein the front truck and the rear truck includes at least two front wheels and two rear wheels coupled to an underside of the longboard deck; at least one slot extending along the length of the underside of the front section and the rear deck section; and at least one structural member configured to be received by the at least one slot.

[0023] According to a second aspect of the present disclosure, there is provided a longboard comprising a longboard deck including a front truck and a rear truck coupled to an underside of the longboard deck, wherein the front truck and the rear truck includes at least two front wheels and two rear wheels coupled thereto, a pair of slots extending along the length of the longboard deck; and a pair of structural members each of which is configured to be received by each slot.

[0024] According to various embodiments, at least one structural member comprises a substantially vertical bar and a substantially horizontal bar attached to the substantially vertical bar at the central point of the horizontal bar to form a T-shaped profile.

[0025] According to various embodiments, the longboard further comprises a drop deck sandwiched between a front angled section and a rear angled section, wherein the drop deck is lower than the height of the front truck and the rear truck.

[0026] According to various embodiments, the at least one slot includes a substantially vertical channel extending through the height of the longboard.

[0027] According to various embodiments the at least one slot further includes a substantially horizontal channel extending from each end portion of the longboard deck to a predetermined length of the longboard deck.

[0028] According to various embodiments, the substantially vertical channel is configured to receive the structural member from a bottom of the longboard deck.

[0029] According to various embodiments, the substantially horizontal channel at each end of the longboard deck is configured to receive an end portion of the structural member.

[0030] According to various embodiments, the at least one slot includes an aperture provided at each end of the slot, wherein the aperture is dimensioned to receive the structural member from one end of the slot.

[0031] According to various embodiments, the structural member protrudes from the underside of the longboard deck when the structural member is received by the at least one slot from the underside of the longboard deck.

[0032] According to various embodiments, the structural member has a first angled extension protruding from a first end of the structural member and a second angled extension protruding from an opposed end of the structural member such that the first angled extension and the second angled extension corresponds to the front angled section and the rear angled section respectively.

Detailed Description

[0033] Reference will now be made in detail to an exemplary embodiment of the present invention, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction with the embodiment, it will be understood that they are not intended to limit the invention to these embodiments. On the contrary, the invention is intended to cover alternatives, modifications, and equivalents, which may be included within the spirit and scope of the invention as defined by the appended description. Furthermore, in the following detailed description of embodiments of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be recognized by one of ordinary skill in the art that the present invention may be practiced without these specific details. In

other instances, well-known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the embodiments of the present invention.

[0034] In the specification the term "comprising" shall be understood to have a broad meaning similar to the term "including" and will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps. This definition also applies to variations on the term "comprising" such as "comprise" and "comprises".

[0035] Certain terminology used in the description is for convenience in reference only and shall not be limiting. For example, up, down, front, back, side, right, and left refer to the disclosed subject matter as orientated in the view being referred to. The terminology will include the words specifically mentioned, derivatives thereof, and words of similar meaning. Like references numbers denote like features, components, or elements throughout the various embodiments.

[0036] To achieve the stated features, advantages and objects, the present invention is directed to a longboard with structural members. Longboards are a category of skateboards. Longboards are designed for longer-distance riding than smaller skateboards, trading portability for a smoother ride. A longboard is a category of skateboard typified by longer decks and wheelbases, measuring approximately 25 cm×140 cm (10″×55″). They have larger-diameter and softer wheels, and often lower riding height compared to street skateboards. Longboard decks are typically made from plywood: anywhere from seven to eleven layers, where each layer is usually 1.5 mm in thickness, and composed of birch, bamboo, maple, and oak wood. They can be shaped by press machine molds into a concave longitudinal bend that provides the rider with a better foothold. Longboard decks are made stiff for stability and strength to take heavier load and can be made from a variety of materials including fiberglass composites. However, the process is tedious and has limited stiffness and strength. Therefore, it is desirable to have alternative designs to increase the strength and stiffness of longboard decks.

[0037] A low deck longboard makes riding more stable and easier to cruise. Common ways to lower the decks are in the construction of the boards. Some longboards have a "drop deck" which is a lowered foot platform that sits below the height of the trucks. This is provided by the "drop through" design that has cut outs that allow the baseplate of the truck to protrude through the board. The term “truck” generally refers to an assembly that supports two wheels on an axle that pivots. Two such assemblies are commonly mounted to the underside of a longboard deck. Each set of trucks has a baseplate that is fastened to the deck and supports a hanger. An axle runs through the hanger. Bushings reside between the baseplate and hanger. A kingpin is pivotally engaged with the baseplate and hanger and retains the bushings. The bushings cushion or dampen the pivoting motion of the hanger, providing control in turning the axle and the connected wheels. Tightening or loosening the kingpin adjusts the trucks for greater stability or faster turning.

[0038] FIG. 1A shows a side view of a conventional longboard 20 in accordance with the embodiments of the present invention. Typically, such a longboard 20 with a low deck poses a problem for riders in some circumstances. When they encounter a narrow and high hump 10 or a similar obstacle that the longboard 20 needs to cross, the longboard 20 is unable to climb over the narrow and high hump because the narrow and high hump will lodge itself between the area between the front wheels and the angled edge of the underside of longboard deck causing a sudden stop which can cause the rider to fall and hurt himself.

[0039] The present invention intends to address this problem. FIG. 1B shows a view of the underside of a longboard 100 and FIG. 1C shows a side view of the longboard 100 in accordance with the embodiments of the present invention. The longboard 100 comprises a front deck section 120 including a front truck 122 and at least two front wheels 121 coupled to an underside of the front deck section 120. It also includes a rear deck section 130 including a rear truck 132 and at least two rear wheels 131 coupled to an underside of the rear deck section 130. On the underside of the longboard 100, there is one structural member 110 mounted longitudinally across the length of the underside of the longboard 100 on each side of a central longitudinal axis 150 of the longboard. In some embodiments,

only one structural member is mounted longitudinally across the length of the underside of the longboard. The structural member is mounted on the central longitudinal axis in this case.

[0040] FIG. 2A shows a bottom view of an underside of a longboard deck in accordance with embodiments of the present invention. The longboard 100 includes a front deck section 120 and a rear deck section 130. The front deck section and the rear deck section includes a drop deck at each end of the deck section. The drop deck is the section that a riders feet are planted when riding. At each end of the longboard, the drop deck includes an angled section 127, 137 connecting the end of the drop deck and a horizontal section 126, 127 for attaching the truck (as shown in FIG. 1C). At each end of the front deck section 120 and the rear deck section 130, an aperture 125, 135 is provided on the horizontal section of the front deck section and the rear deck section for the front truck and the rear truck to be respectively installed. Along the length of the drop deck of the longboard, a slot 111 is provided that extends along the length of the underside of the drop deck of the front deck section 120 and the rear deck section 130. The slot 111 is positioned at each side of the central longitudinal axis 150 of the longboard deck. It also includes at least one structural member configured for mounting onto the slot. Each slot 111 is configured to correspond to the shape of the structural member 110 details of which will be disclosed hereinafter.

[0041] FIG. 2B shows a perspective view of structural members configured for mounting on the underside of the longboard deck in accordance with embodiments of the present invention. The structural member 110 includes a substantially vertical bar and a substantially horizontal bar attached to the substantially vertical bar at the central point of the horizontal bar to form a T-shaped profile. In some embodiments, the structural member 110 is inverted to form an inverted T-shaped profile. The structural member 110 is shaped in a manner such that the structural member 110 corresponds to the slot 111 to facilitate the mounting of the structural member 110 to the slot 111. In some embodiments, the structural members are made of metal or any suitable material that together with the longboard deck, is capable of withstanding the weight of the rider. The structural member 110 is inserted into the slot 110 from the top “upright T” or from the bottom “inverted T”

into the slots 11. In use, this means that the structural member is inserted into the slot 110 from the bottom of the longboard deck or from the top surface of the longboard deck. The structural member is secured to the longboard deck by countersunk tapping screws or countersunk bolts and nuts, or any other suitable fastener capable of attaching the structural member to the slot. The combined structure of the longboard deck and metal structural member produces a very strong and stiff longboard deck.

[0042] FIG. 3A shows a side sectional view of the front deck section of the longboard in accordance with embodiments of the present invention. FIG. 3B shows a perspective view of the structural members 110 in accordance with embodiments of the present invention. To avoid the edge of the structural members 110 from hitting the hump 10, each structural member 110 has an angled protrusion that conforms to the angled section of the longboard deck. As mentioned, each structural member 110 has an angled protrusion 112 that extends upwardly such that the angled protrusion 112 conforms to the angled section 127,137 of the longboard deck. FIG. 3C shows a perspective sectional view of the underside of the rear deck section of the longboard with the two structural members mounted in accordance with embodiments of the present invention. By providing the angled protrusion 112 that conforms to the angled section 127, 137 of the longboard deck, the longboard will provide a stiff and stable deck while clearing narrow and high humps with ease. With a stiffer and enhanced longboard deck, this allows manufacturers to produce a lower drop deck that provides enhanced stability.

[0043] FIG. 4A shows a sectional view of the front deck section of the longboard deck with structural members mounted in accordance with embodiments of the present invention. In this embodiment, the structural members 110 are mounted on the slots of the longboard deck from the bottom of the longboard deck such that each structural member 110 has an extended horizontal section 116 that extends from the base of the drop deck. By providing the extended horizontal section 116 of the structural member 110, the longboard allows a rider to clear narrow and high humps with ease as the extended horizontal section 116 provides a surface for sliding on contact with the narrow and high hump allowing the rider

to clear the hump easily. The construction of the structural members also provides the longboard deck with a stiffer and enhanced longboard deck and this allows manufacturers to produce a lower drop deck that provides enhanced stability.

[0044] FIG. 4B shows a side view of the longboard deck with structural members mounted in accordance with embodiments of the present invention. In various embodiments, each structural members 110 is mounted on each slot of the longboard deck such that each structural member 110 has an extended horizontal section 116 that extends from the base of the drop deck. The extended horizontal section 116 is constructed to be close to the front truck (not shown) or beside the front wheels so that when the front wheels climb the hump, the end of the extended horizontal section is past the hump. When the structural member 110 lands on the hump, the structural member 110 will engage the hump and slide along the length of the structural member and the extended horizontal section 116 instead of having an edge of the structural member getting stuck on the hump and causing a sudden jerk. The structural members 110 are mounted in a way such that they are as wide apart from each other for better structure but well within the front wheels so that they do not interfere with the operation of the front wheels. In some embodiments, the extended horizontal section 116 is also provided on the rear deck section. In this embodiment, the structural member 110 is flushed with the underside surface of the base of the longboard deck. By having the structural member flushed with the underside surface of the base of the longboard deck, this will cause the vertical bar of the structural member to protrude slightly from the top or upper surface of the longboard deck. This provides greater structural strength to the longboard deck and also provides a foot hold for the rider. By providing the extended horizontal section 116 of the structural member 110, the longboard allows a rider to clear narrow and high humps with ease as the extended horizontal section 116 provides a surface for sliding on contact with the narrow and high hump allowing the rider to clear the hump easily. The construction of the structural members also provides the longboard deck with a stiffer and enhanced longboard deck and this allows manufacturers to produce a lower drop deck that provides enhanced stability.

[0045] In various embodiments, the slot 111 is a vertical channel that extends from the base of the longboard deck to a predetermined height of the longboard deck or through the longboard deck to the upper surface for allowing the vertical bar of the structural member to be inserted therein. In various embodiments, the vertical channel is suitably dimensioned to receive the vertical bar of the structural member so that it provides a good fit with the vertical channel. FIG. 5A shows a sectional view of the underside of a longboard deck with slots 111 and FIG. 5B shows a front view of a longboard deck with slots 111. In various embodiments, the slot 111 includes a vertical channel that extends from the base of the longboard deck through to the upper surface of the longboard deck. In other words, the vertical channel is a vertical channel that goes through the longboard deck from the bottom to the upper surface of the longboard deck. In some embodiments, the vertical channel extends partially from the base of the longboard deck to a predetermined height of the longboard deck. In some embodiments, a horizontal channel is located at the base of the vertical channel and extends from one end of the longboard deck to the other end of the longboard deck. In other embodiments, the horizontal channel extends only partially from one end of the longboard deck to a portion of the longboard deck at each end. The horizontal channel is shaped in a manner that conforms to the shape of the structural member. In some embodiments, the slot has a T-shaped profile and is suitably dimensioned to fit the horizontal bar of the T-shaped structural member 110. In some embodiments, the slot is suitably dimensioned to receive the T-shaped structural member so that the base of the structural member, i.e. the horizontal bar is flushed with the base of the longboard deck.

[0046] FIG. 5C shows a rear sectional view of the underside of a longboard deck with slots 111 in accordance with embodiments of the present invention. In various embodiments, a bore 118 extends into each slot 111 at each end of the longboard deck where the slot resides. The bore 118 is provided at the angled section 127 of the longboard deck and extends through the slot 111 and is suitably dimensioned so as to allow the structural member 110 to be received through the bore 118 at each end of the longboard deck. In use and in order to mount the structural member 110 on the longboard deck, a user will first push one end of the structural member 110 through the bore 118 at one end of the slot 111 till it reaches the other end of the bore 118. Once the structural member is mounted such that it a portion

of the structural member protrudes at each bore 118, the user will attach the structural member to the longboard deck by affixing screws which can be received through the structural member through apertures spaced apart on the structural member.

[0047] FIG. 6A shows a perspective view of a longboard with structural members mounted on the longboard deck in accordance with embodiments of the present invention. In various embodiments, the structural members 110 are shown mounted on the longboard deck and slightly protruding from the vertical channels that extend through the longboard deck. FIG. 6B shows a perspective view of another longboard with structural members mounted on the longboard deck in accordance with embodiments of the present invention. In various embodiments, the structural members 110 are shown extending through the bores 118 at each end of the longboard deck and slightly protruding from the vertical channels that extend through the longboard deck. By allowing the protrusion of the structural member 110 from the vertical channel, this provides enhanced structural strength and provides a foot hold for the rider.

[0048] FIG. 7A shows a side view of a longboard deck in accordance with embodiments of the present invention. In various embodiments, the angled section 127 of the longboard deck has a kink 130 at the base of the angled section 127 at each end of the base of the drop deck. The kink 130 helps to provide structural rigidity to the longboard. FIG. 7B shows a bottom view of a longboard deck in accordance with embodiments of the present invention. In various embodiments, slot 111 includes a vertical channel that extends from the base of the longboard deck through to the upper surface of the longboard deck. In other words, the vertical channel is a vertical channel that goes through the longboard deck from the bottom to the upper surface of the longboard deck. In some embodiments, a horizontal channel 129 is located at the base of the vertical channel and extends from one end of the longboard deck to the other end of the longboard deck. In some embodiments, and as shown on FIG. 7B, the horizontal channel 129 extends partially from one end of the longboard deck to a portion of the longboard deck approximately to about a quarter of the length of the longboard deck. The height of the horizontal channel 129 is preferably less than the height of the structural member 110 so that the structural member 110 is not flushed with the base

of the longboard deck when the structural member is inserted into the slot 111. The horizontal channel 129 is shaped in a manner that conforms to the shape of the structural member. In this embodiment, the slot 111 is provided to allow the structural member 110 to be mounted on the longboard deck which has a kink at each end. The slot 111 has a vertical channel extending through the height of the longboard deck and extending longitudinally through the longboard deck. This allows the structural member 110 to accommodate the kink and to be suitably fitted at the center of the longboard deck for mounting the structural member to the longboard deck at each end.

[0049] FIG. 7C shows a perspective view of a structural member 110 and FIG. 7D shows a side view of the structural member 110 in accordance with embodiments of the present invention. In various embodiments, the structural member 110 protrudes from the longboard deck at each end. To accommodate the angled section 127 of the longboard deck, the structural member can similarly provide an angled protrusion that can fit the angled section 127 of the longboard deck. The structural member 110 also includes a protrusion extending horizontally from the longboard deck to allow the longboard to clear narrow humps.

[0050] FIG. 8 shows a rear view of a longboards 100 with variable lengths in accordance with embodiments of the present invention. The longboard 100 comprises a front deck section 120, a rear deck section 130 and a center deck section 125. In order to customize the length of the longboard 100, the length of the center deck section 125 can be varied to adjust the aggregate length of the longboard 100 to suit a rider's preferences. In some embodiments, if it is desired to customize the longboard length for a young child learning skateboarding, the longboard 100 can include just the front deck section 120 and the rear deck section 130 without the center deck section. Each longboard 100 includes at least one structural member 110 extending along the length of the longboard deck or the drop deck if one is available. The structural members 110 are positioned on each side of the central longitudinal axis of the longboard. Each longboard includes at least one slot for receiving the structural member 110.

[0051] While the invention has been particularly shown and described with reference to specific embodiments, it should be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. The scope of the invention is thus indicated by the appended claims and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced.