

[54] SPORTING APPARATUS

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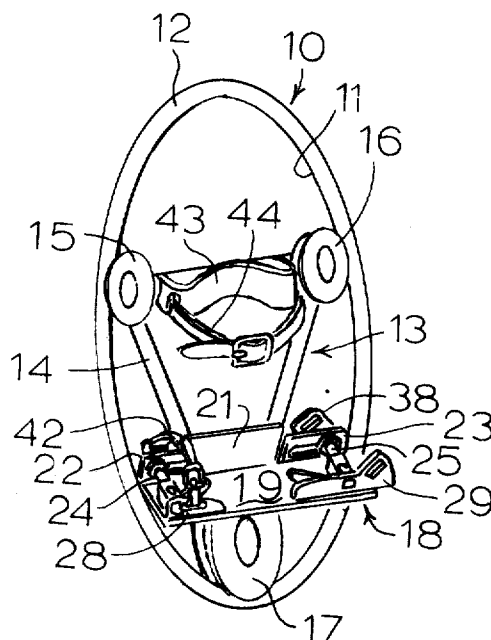
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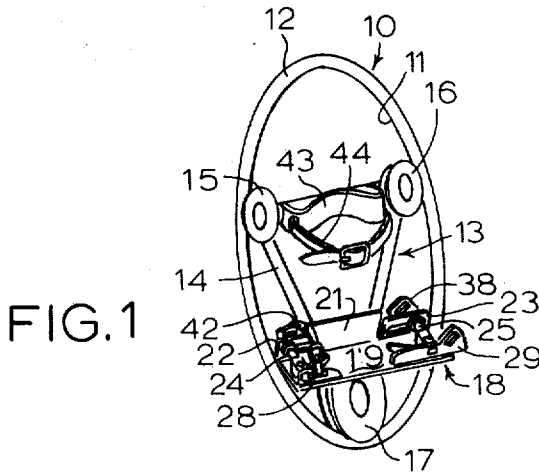
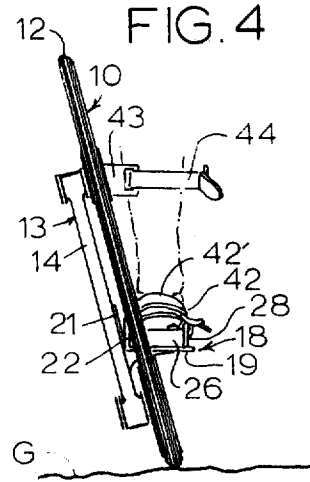
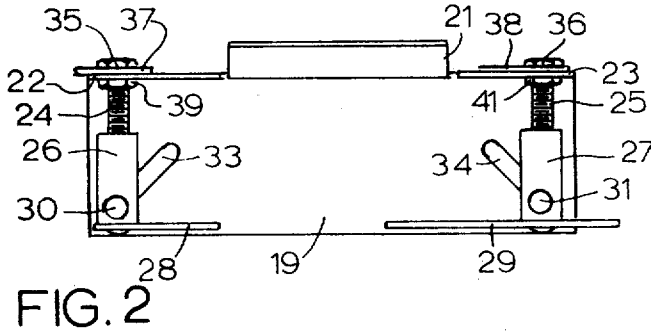
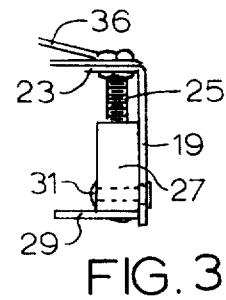
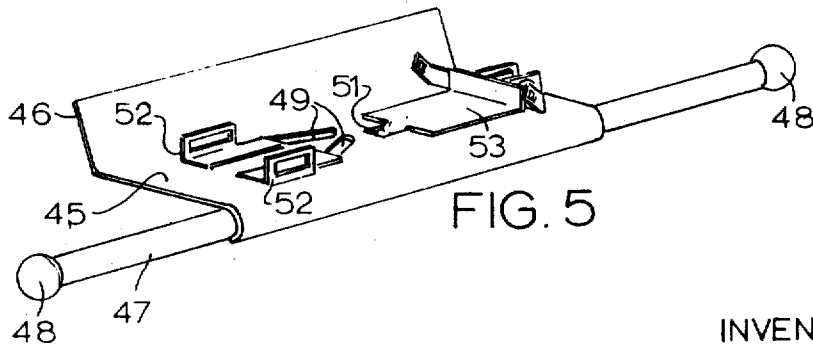
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[57] ABSTRACT

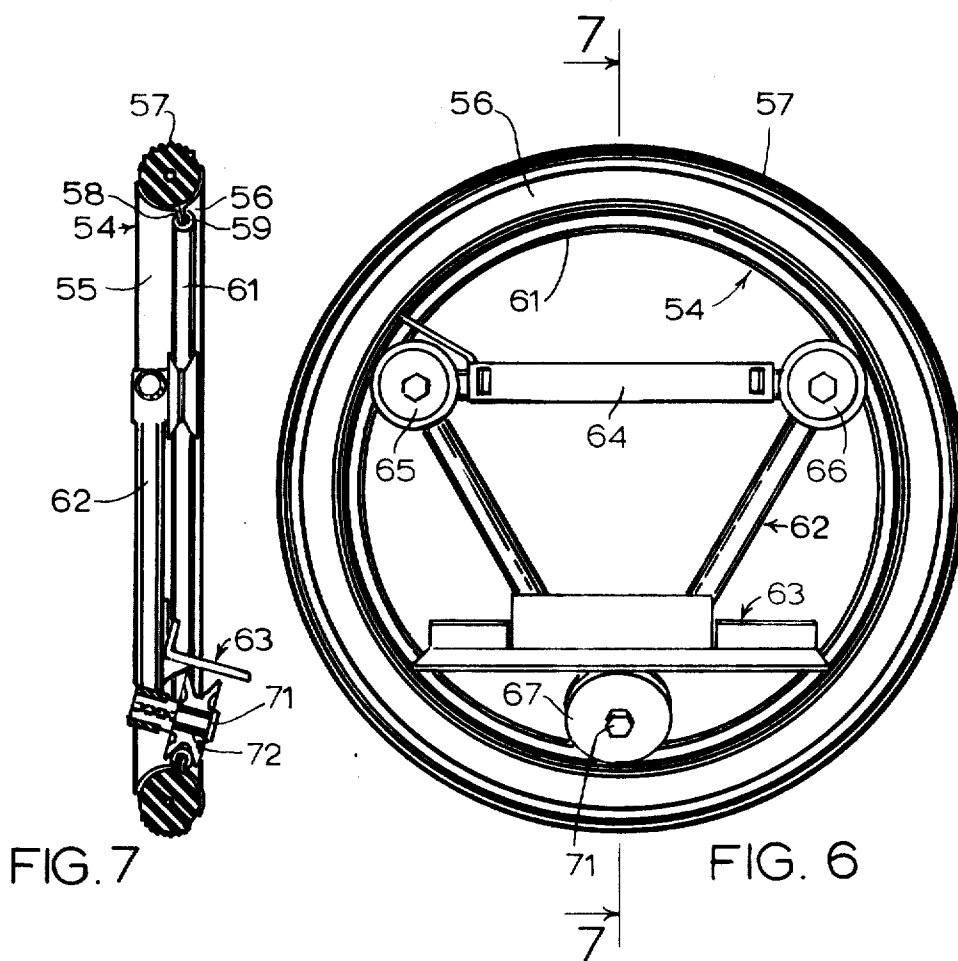
Unique sporting apparatus comprising skate-like devices attaching not only to the feet but to the legs of the user. Such devices feature a single large diameter wheel which is revolvable relative a bearingly mounted frame embodying a laterally projecting foot support. On applying a pair of such devices to the feet, the wearer is elevated a significant distance from ground surface and may glide with exciting physical sensations over a variety of ground surface.

10 Claims, 7 Drawing Figures





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SPORTING APPARATUS

THE INVENTION

A new skate-like device lending the wearer a stilt-like elevation from ground surface and combined mobility, speed, dexterity of movement, and sensation beyond that available in the use of conventional wheeled sporting equipment.

BACKGROUND OF THE INVENTION

Through the years there have been a great variety of cycles, skates and like apparatus for providing individual physical activity and recreational amusement. For example there have been ice skates and roller skates, each characterized by limited mode and area of use. Moreover, they have been so designed to give the wearer the sensation of a closeness to ground surface. There are also bicycles and unicycles which have had wider areas of application but have proven to be more limited as to maneuverability in limited spaces. Apart from this, such devices do not give the pleasurable sensations associated with the use of skates.

SUMMARY OF THE INVENTION

The present invention combines the maneuverability of ice skates, the flexibility of usage available in wheeled sporting equipment, and the inherent possibility of new and exhilarating sporting sensations. The invention devices in a preferred embodiment comprise a relatively large diameter wheel embodying a frame attaching to the foot and leg of the wearer. The rim of the wheel bears on and revolves freely about the frame. On applying a pair of such devices to his feet, the wearer is elevated and may in this position execute a great variety of skating or gliding maneuvers, on one or both feet. The invention embodiments are characterized, nevertheless, by a low load-suspension bearing system affording stability to the user.

It is a primary object of the invention to provide a sporting device which is unique in character, relatively simple to fabricate, efficient and satisfactory in use and adaptable to a wide variety of applications.

A further object of the invention is to provide skate-like devices affording a new and exhilarating form of exercise and amusement to the wearer.

Another object of the invention is to provide a generally new skating device of unique and durable construction.

An additional object of the invention is to provide a unique single wheel skate-like device providing a light weight mobile attachment to the foot.

Another object of the invention is to provide skate-like devices providing single wheel attachments to the feet of the wearer so designed to provide a low level suspension for the wearer enabling an easy shifting of his center of gravity with consequent stability and ease of control in manipulation.

An additional object of the invention is to provide skate-like devices in which the hands can be readily applied for braking, direction control and the like.

A further object of the invention is to provide a single wheel skate-like device embodying means for applying thereto a braking pressure utilizing a rocking motion of the foot.

Another object of the invention is to provide a sporting device possessing the advantageous structural features, the inherent meritorious characteristics and the means and mode of use herein described.

With the above and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation as hereinafter described or illustrated in the accompanying drawings, or their equivalents.

Referring to the drawings wherein are shown some but not necessarily the only forms of embodiment of the invention,

FIG. 1 is a partially diagrammatic perspective view of a skate-like device in accordance with one embodiment of the invention;

FIG. 2 is a plan view of the foot support embodied in the device of FIG. 1;

FIG. 3 is an end view of the device shown in FIG. 2;

FIG. 4 is an elevation view of the device of FIG. 1 as applied to the leg and viewing the same from the front;

FIG. 5 is a perspective view showing details of an alternate form of foot rest;

FIG. 6 is a side elevation view of a further embodiment of the invention; and

FIG. 7 is a cross-sectional view taken on line 7-7 of FIG. 6.

Referring to the skate-like device illustrated in FIGS. 1 through 4 of the drawings, it is seen to comprise a hoop-like wheel unit 10 and an offset rigidifying frame unit 13. These units are so related that they can freely revolve, one relative to the other.

The wheel 10 consists of a rim 11 and a tread 12. The rim 11 is provided by a continuous ring of steel tubing formed on a constant radius. In a preferred embodiment the tread 12 is a layer of rubber or rubber-like material encompassing the outer periphery of the steel ring and bonded thereto, as by vulcanizing. In the alternative, the rim 11 and tread 12 may be molded, in one piece, of a suitable tough, hard plastic material. The inner periphery of the ring forming the rim 11 is transversely arcuate in a convex sense and defines a continuous smooth track for the frame unit 13.

Tracking on the inner periphery of rim 11 are three small wheels or rollers 15, 16, and 17. These wheels are triangularly disposed, as shown in FIG. 1, to have their centers define the corners of an isosceles triangle, the largest wheel 17 being placed lowermost at what might be considered the apex of the triangle and the two smaller wheels 15 and 16, of equal size, being shown uppermost, on a horizontal line, to the ends of what would be considered the base of the triangle. The outer periphery of each of the tracking wheels has a circumferential groove of a form complementary to the inner periphery of the rim 11. The tracking wheels thus nest the rim 11 and provide a lateral containment thereof to an extent there is a firm and smooth interrelation of the same to permit a relative free revolving motion of the wheel and the frame.

The wheels 15, 16, and 17 are accordingly co-planar with the rim. Moreover, they are rotatably mounted in an end contained relation to pivot pins which project perpendicularly from an adjacent triangular carriage 14 which together with the wheels form the frame unit 13.

The carriage is positioned in a plane parallel to and immediately adjacent the plane of the wheel unit. It is formed of light weight but high strength magnesium or aluminum tubing to provide a triangle in the corners of which are integrated and from the plane of which are perpendicularly projected the pivots for the wheels 15, 16 and 17. The latter are preferably made of Nylon, Lexan, Delrin, or equivalent tough durable plastic. It is preferable also that the largest or load bearing wheel 17 embody sealed ball bearings or roller bearings so as to insure the rotation thereof with minimum friction and wear in use.

Referring to FIG. 1, a foot support 18 is fixed to the carriage 14 in a line generally parallel to the base of the triangle formed thereby and in bridging relation to its two dependent convergent legs, spaced immediately above the roller 17. The support 18 comprises a base plate 19 having at the central portion of its inner edge an outwardly divergent upstanding flange 21. The latter is secured as by welding to the dependent tube segments of the carriage 14. Noting FIG. 4, it will be seen that the plate 19 extends laterally of the carriage 14 to project through the plane of the wheel 10 and in a plane inclined downwardly to ground surface. The purposes of this will soon be obvious. At the remote ends of the inner edge of the plate 19 adjacent the carriage 14, the plate 19 has further upstanding flange segments 22 and 23 which are perpendicular thereto. Each of the segments 22 and 23 has formed therein a longitudinally extending slot. A screw shaft 24 or 25, as the case may be, is projected through each of the slots in the flange segments 22 and 23 to have the expanded head thereof abut the surface of the

flange segment most adjacent the carriage 14. The screw shafts project across the respective ends of the plate 19 to threadedly engage, respectively, in a sleeve 26 or 27, the remote ends of which have respectively fixed thereto a plate 28 or 29. Projected through each of the sleeves 26 and 27 is a vertically oriented stud, in the one case defined as 30 and in the other as 31. The lower ends of these studs project through slots 33 and 34 in the respective ends of plate 19. The slots 33 and 34 are angled inwardly from the outer remote corners of plate 19 towards the flange 21. Of course, the dependent extremities of the studs have means fixed thereto whereby to contain these sleeves 26 and 27 in tracking relation to the slots 33 and 34. Also, mounted on the screw shaft 24 to the side of plate segment 23 remote from the head of the shafts is a nut 39. A similar nut 41 is similarly positioned on the remote screw shaft 25.

Viewing FIG. 2 of the drawings in particular, it may be there seen that the flange segments 22 and 23 together with the generally parallel plates 28 and 29 fixed to the sleeves 26 and 27, and with the sleeves and the related screw shafts 24 and 25, form a pocket for a foot. As will be obvious, on loosening the nuts 39 and 41 on the shafts 24 and 25 one may freely adjust the elements defining this pocket, within the limits of the control slots 33 and 34 to cause approaching and separating motions of the parts to achieve a selective size pocket for the foot applied to the plate 19. Viewing FIGS. 1 through 4 of the drawings, it will be further seen that in connection with the plate segments 22 and 23, to the side thereof adjacent the carriage 14 are anchor plate segments 37 and 38. These plate segments 37 and 38 to either end of the plate 19 have apertures, as do the plates 28 and 29, through which fastening straps may be applied, as seen in FIG. 4, to firmly secure a foot in place on the support 18. These straps include a toe strap 42 and an ankle strap 42'.

Referring to FIG. 1, it is there noted that to the side of the carriage adjacent the foot support 18 there is fixed to the uppermost and horizontally disposed segment a bracket 43. The bracket 43 projects in a downwardly inclined angle with reference to the plane of the wheel 10 and in a sense generally parallel to the plate 19. Its outermost surface is concave to nest one side of a leg and its remote ends provide anchors for interlocking strap segments 44 which may be fastened about a leg, the foot of which is secured to the support 18.

With the orientation of the parts as above described, seen most clearly in FIG. 4 of the drawings, while the carriage, through the medium of the rollers 15, 16, and 17, tracking on the rim 10 and in the plane thereof, disposes at an inclination to ground surface, the foot support 18 has base 19 thereof in a plane generally parallel to ground surface, as the device is fitted to the wearer.

Thus, as shown, we have the tubular frame carriage 14 assuming the attitude of an inverted triangle with the lowermost roller 17 in connection therewith being in a load sustaining position beneath the foot support 18 and at an angle to ground surface. Take particular note that as the device is applied to the foot, the foot support lies below the center of the wheel.

In use it will normally be that a device is applied to each foot of the wearer. Accordingly, when the wearer has applied the devices and assumes an upright position thereon, the wheel units 10 dispose to the outer sides of the respective feet and legs of the wearer and at angles which dispose the wheels in a downwardly convergent relation as they extend to ground surface and, of course, in a diverging relation as the wheels extend upwardly from ground surface. Particular attention is directed to the fact that the wheel is contemplated as being of a relatively large size so as to extend generally from ground surface to the level of the wearer's knees. This brings a stilt-like elevation to the wearer and a sensation of significant elevation from ground surface. Of course, the invention comprehends the use of wheels of varying diameter. However, as noted, the stilt-like effect will give the user a sense of exhilaration.

It will be obvious, of course, that as a person places his foot on the base plate 19, he merely need release the lock nuts as previously described and adjust the screws to achieve the desired clamping engagement of the foot in place. For best results the toe and heel of the foot should abut sleeves 26 and 27 to contain it against relative endwise motion while the lateral abutment of the plate segments 22, 23 and 28, 29 with the sides of the foot will prevent lateral motion. The toe and ankle straps are tightened over the foot and the leg strap is fastened to the extent that the rider will feel one with the applied device while avoiding tightening which will interfere with circulation and give discomfort.

In effect, once the wheel unit becomes fastened to the user's leg, it becomes a part thereof. The rider is then able to raise, turn and swing the wheel in correspondence with the normal leg movements. Note that since opposite ends of the plate 19 are to opposite sides of the roller 17, downward pressure exerted by the heel or toe moves the foot rest 18 angularly, a motion accommodated by rolling movement of the rollers 15-17 on the track defined by the rim 11.

Let us now consider the operation of the invention device, assuming a pair are attached to the legs of the user. With a stable vertical position the foot rest of each device is by lateral pressure of the foot made to assume a position approximately parallel to ground surface. In this position the user will stand comfortably by reason of the vertically spaced points of attachment of the leg and foot to the wheel. Of course, the wheel itself assumes a tilted relation to ground level, inclining upwardly and outwardly of each leg. It is accordingly positioned for a sensitive response to the guiding movements of the users foot. Also, the wheel rim most adjacent ground surface is placed directly under the foot support so that the load forces, as a user is standing upright on the foot support 18, will be applied along a line intersecting or substantially intersecting the plane of the rim. This gives substantial strength, durability and ease of operation in use of the device.

In operation the wheel unit will tend to roll on ground surface while the carriage 14, weighted by the rider, remains relatively stationery while the wheel revolves thereabout. With the devices on both legs the user is elevated and completely mobile. He may coast on the wheels, in the process learning to stabilize and balance himself with complete ease. By hand applied forces the user may influence the movement of one wheel or the other and thereby create movements of various nature. Further, since the wheel units are in effect part of the legs, as the legs are alternately swung forward and subjected to rearward thrust, the user may achieve all sorts of propulsion, substantially in the manner of skating. Guiding may be effected by direct relation to the turning and positioning of the feet. One may toe in and toe out for braking purposes.

In general, the large wheels will give a stable and comfortable ride, allowing for relatively high speeds and permitting travel over a variety of surfaces in a substantially elevated relation to ground surface. The relatively high rise of the wheels makes them readily accessible to the grasp of the rider for control thereby as well as by movements of the feet. As a matter of fact, by grasping the rims one may control the wheel units against relative rotation and use the devices in a form comparable to stilts.

In coasting, one can achieve a ski-like action by holding the legs in a striding position, placing a pair of the wheel units in longitudinally offset relation.

In any case, one may independently operate the devices on the respective feet, lifting one or the other and even spin on one, the ability to do this being enabled by the particular construction of the invention device. As a matter of fact, the many maneuvers available to one seeking exercise and recreational amusement are such as to give the user a tremendous amount of self-confidence as well as increasing the dexterity and agility of his movements both on and off the invention devices.

For a novice to become readily used to the devices, once applied and in an upright position he can first grasp the wheel rims by the hand and do a stilt walking type of step until he

gets the feel. He can then gradually loosen his grip to get the rolling action and find himself coasting, using first one foot ahead of the other to provide a vertical front to back stability. He can find that on increasing the spread of the legs he will enable a balance to achieve heel braking on the front wheel and toe braking on the rear wheel the noted portions of the feet respectively depressing with this fore and aft spread.

Of course, one can apply the device on one foot and achieve a sort of scooter propulsion. Also, once one becomes adapted, one can in the process raise himself on the device per se and spin on the very point that the unit rests on ground surface as well as moving back and forth in oscillating motions. All this is enabled because we have in effect a substantially point contact with ground surface directly below the center line of the users foot. This orientation is significant in wearing a pair of the devices and enabling shifting of the weight from one wheel to the other without undue tendencies to tip. In respect to the stability provided, it is noted that the bottom roller 17 is the one which carries the bulk of the load and its bearings and size must be carefully engineered to provide the strength and minimum friction drag required for greatest facility of operation. The rollers 15 and 16 assist in maintaining the load roller in proper position and to hold the rim 11 in proper alignment at all times.

While the invention has been particularly shown in FIGS. 1 through 4 to embody one wheel unit per foot, it should be readily apparent that a pair of the units may be used in tandem with a connected foot support to provide a ski-like device. In use of this, one can achieve the sensations of cycling and achieve a certain degree of acrobatics in shifting of the body during use.

FIG. 5 of the drawings illustrates a modification of the foot support. Here the base plate 45, comparable to the plate 19 of the device of FIG. 2, has its inner edge turned up the length thereof to form a flange 46 corresponding to the flange 41. The opposite or outer edge is curled over and under to receive and clamp therein a rod 47. The latter substantially projects from either end of the plate 45 and has on each respective extremity wear-resistant knobs 48. In the base plate 45 are three slots, a longitudinal extending slot 51 and spaced forwardly thereof a pair of divergent slots 49. Seating in bearing relation to the upper surface of the plate 45 are toe clamps 52 which are adapted for movement forwardly and rearwardly and to and from each other by portions thereof engaging in slots 49. Similarly, a heel clamp 53 is provided on the plate 45 having a portion anchored for sliding relation in and guiding by the slot 51. On the underside of the plate 45 are conventional means, not shown, for releasably clamping the heel and toe plates in any selected position of adjustment as accommodated by the related slots. The toe plates or clamps have generally parallel positioning portions suitably apertured for passage therethrough of strap means to provide a toe clamp. Similarly, lateral extremities to the rear of the heel plate or clamp has brackets for attachment of straps which may be passed over the ankle of the user.

In reference to this modified foot support as shown in FIG. 5, when this is used on the carriage 14, there is a braking facility added through the medium of the rod 47. In use, the foot support will be generally horizontal but by depressing the heel or toe one may rock the entire carriage 14 to cause one knob or the other to frictionally engage ground surface. By a longitudinal adjustment of the rod 47 to project more or less to the rear or to the front of the plate 45, one can make the braking means thus provided more readily responsive to heel pressure or toe pressure. Of course, the knobs 48 which serve the braking purposes may be made replaceable.

Now referring to FIGS. 6 and 7, there is here disclosed an alternate form of construction for the invention devices. In this embodiment the rim 54 is provided by making annular sections 55 and 56 which together form a circumferential cup nesting the inner periphery of a solid rubber or rubber-like tire 57. In this case, the outer periphery of the tire is formed with a projected serrated tread for a gripping engagement to ground

surface. Particular attention is directed to the fact that the mating annular sections 55 and 56 have at their adjacent edges flanges which project interiorly of the rim in a sense inclined to the central plane of the tire 57. The tread portion on the tire 57 is displaced oppositely. Further, a cinch ring 61, C-shaped in cross section, serves to clamp the flanges 58 and 59 and lock them together to form an integral structure. The smooth arcuate surface of the ring 61 which is thereby disposed innermost of the wheel unit then serves for the tracking thereon of the wheels of the rigidifying carriage which may be of the nature previously described. The carriage and the wheel unit are thus relatively revolvable. There is a difference however in this case in that the upper rollers 65 and 66 are essentially in a plane immediately adjacent and parallel to the plane of the tire 57 whereas the lower and load supporting larger roller 67 is in a plane commonly occupied by the flanges 58 and 59, a plane which is perpendicular to the center line of the foot rest 63 which inclines to the plane of the carriage as in the first described embodiment of the invention. Moreover, in this case the carriage 62 which is comparable to the carriage 14 lies in a plane immediately adjacent and parallel to the plane central to the tire 57.

It will be noted that only so much detail has been repeated in reference to the frame unit as is necessary for an understanding of this modification of the embodiment illustrated in FIG. 1. By virtue of the showing in FIGS. 6 and 7, one may see that as one applies the device to the foot the tire 57 in conjunction with the rim will incline upwardly and outwardly of the leg as in the first described embodiment with the load having a low central support and the effect thereof being accommodated directly through the large roller 67, the ring 61 and the flanges 58 and 59 of the rim unit. It is to be kept in mind that the tread is centered on ground surface and the load is directly there above in a normal usage position of this skate-like device.

The alternate rim form provided in the embodiment of FIGS. 6 and 7 enables an alternate means of loading the wheel as it relatively revolves in reference to the carriage and it enables a simplified rim fabrication. In this connection the elements of the rim may be stamped, molded or otherwise inexpensively formed.

It will be self-evident that the embodiment of FIGS. 6 and 7 may be used with the same advantage and interest as the first described embodiment of the invention.

In summary there has been here provided a unique device lending itself to a new means for enjoyable physical exercise and recreational amusement. The invention lends itself to use by people of all ages and not only will be advantageous to the health but will increase self-confidence in that a mastering of the use will create dexterity, speed and agility of body movement.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise but one of several modes of putting the invention into effect and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. A skate-like device including ring means peripherally adapted for rolling and gliding movements on ground surface, said ring means providing an inner peripheral portion of a wheel unit and track means in connection with the ring means for movement therewith, said track means providing a continuous circular track, foot support means having in connec-

tion therewith means mounting the same on said track means and for relative movement therebetween, a carriage providing the means for mounting said foot support means and having in conjunction therewith a triangular arrangement of tracking wheels in tracking engagement with said continuous track, said foot support means being arranged to dispose directly over one of said tracking wheels and being offset toward said one tracking wheel and from the other tracking wheels which are equidistant therefrom.

2. A skate-like device as in claim 1, characterized by said foot support means providing a base plate for the foot which is inclined relative to the plane of said ring means and at least said one tracking wheel being below said base plate and the center line of said base plate lying substantially in the plane occupied by the central plane of said one tracking wheel.

3. A skate-like device, including a relatively large diameter wheel means rotatable on ground surface and the like, a continuous circular track in connection with said wheel means and rotatable therewith, a carriage comprising a frame disposing parallel to said wheel means and peripherally contained thereby, said carriage including tracking wheels in rolling engagement with said track, said tracking wheels comprising a plurality of wheels in an arrangement wherein one tracking wheel is offset to normally dispose downwardly from the others toward ground surface, and a foot support on said frame overlying said one downwardly disposing tracking wheel and orienting angularly of said frame, said foot support being offset with respect to the axis of said wheel means toward said one tracking wheel and positioned below other of said tracking wheels.

4. Apparatus as in claim 3 characterized by said foot support having in conjunction therewith means to effect a braking action on said wheel means on movement thereof over ground surface.

5. A device as in claim 3 characterized in that said frame has leg engaging means to provide for a secure fastening of the leg of the user in a generally perpendicular relation to said foot support, said wheel means being interrelated to dispose at an angle to said foot support and having the center thereof upwardly of said foot support to provide for a low level suspension of the load applied to the foot support.

6. Apparatus as set forth in claim 5, characterized by the load applied to the foot support being accommodated in said wheel means through the medium of said tracking wheels in

engagement with said track and at least one of said tracking wheels being directly below said foot support to direct the application of the load applied thereto.

7. A skate-like device, including a relatively large diameter wheel means rotatable on ground surface and the like, a continuous circular track in connection with said wheel means and rotatable therewith, a carriage peripherally contained by said wheel means including tracking wheels in rolling engagement with said track, said tracking wheels comprising a plurality of wheels in an arrangement wherein one tracking wheel is offset to normally dispose downwardly from the others toward ground surface, and a foot support forming a part of said carriage and overlying said one downwardly disposing tracking wheel, said foot support being offset with respect to the axis of said wheel means toward said one tracking wheel and positioned below the other of said tracking wheels, said carriage comprising a frame disposing parallel to said wheel means, said foot support being secured to said frame to project laterally thereof and including a base plate orienting to incline downwardly of said frame.

8. A skate-like device according to claim 7, wherein said frame has a triangular configuration with said tracking wheels mounted at the corners thereof, said frame being normally inverted with the base portion thereof disposing above the axis of said wheel means and the apex portion disposing below said axis, said downwardly disposing wheel being on said apex portion, a rider of the device having his foot on said base plate of said foot support and his leg above the foot projecting to and above said base portion of the frame, characterized by means on said base portion of the frame to engage the leg of a rider above his foot.

9. A skate-like device according to claim 8, characterized by a pair of said devices having the foot supports thereof adapted to mount to the respective feet of a rider, the load being directed to ground surface in lines through said wheel means in such manner that said wheel means dispose to be upwardly divergent and to either side of the legs of the rider.

10. A skate-like device according to claim 8, wherein said other tracking wheels locate along said base portion of said frame and are mounted to be substantially co-planar with said circular track, the downwardly disposing tracking wheel inclining out of the plane of said track, its axis substantially paralleling the inclining base plate portion of said foot support.

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