A. J. KENNEDY.

SKATE.

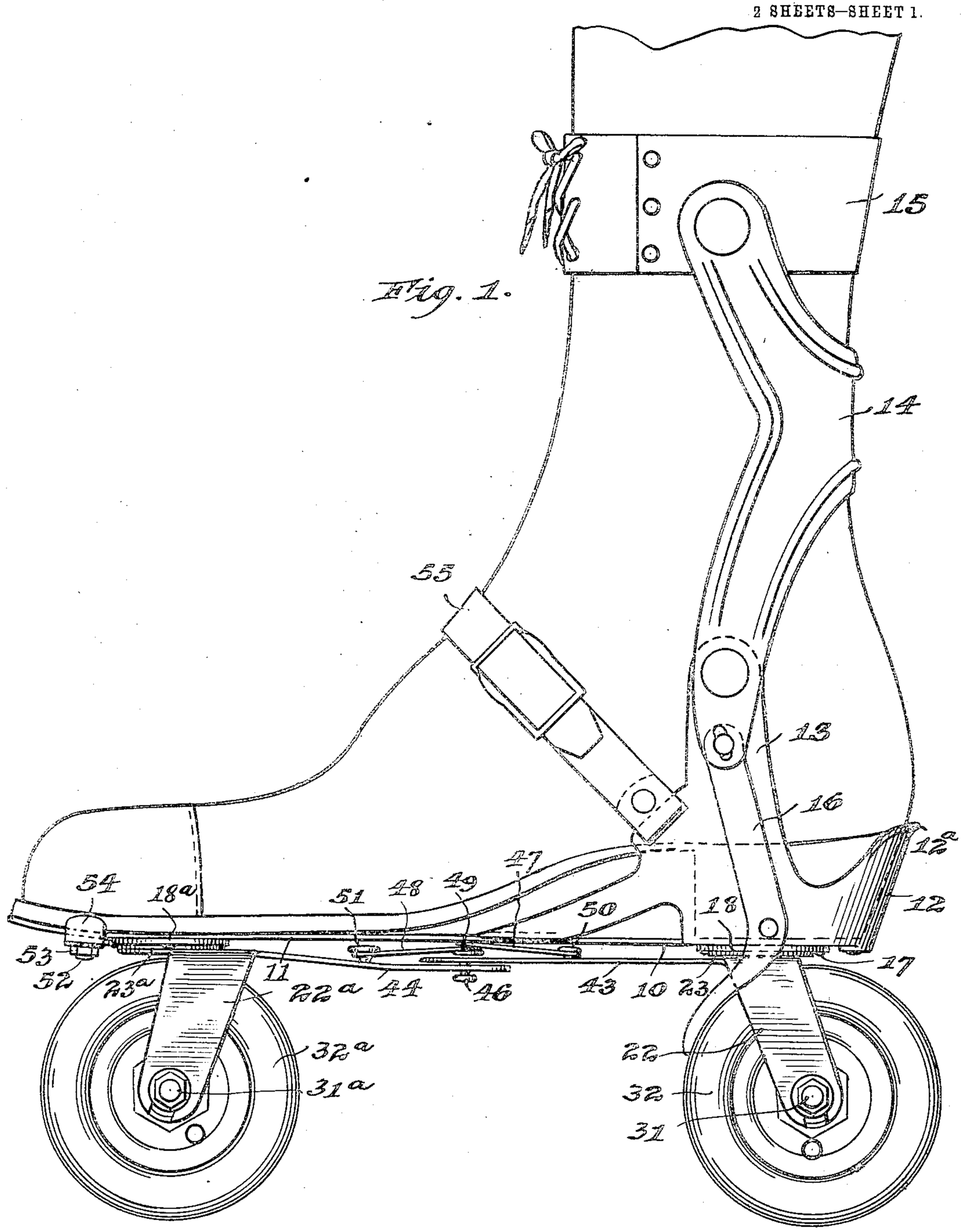
APPLICATION FILED JAN. 16, 1909.

979,169.

Patented Dec. 20, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

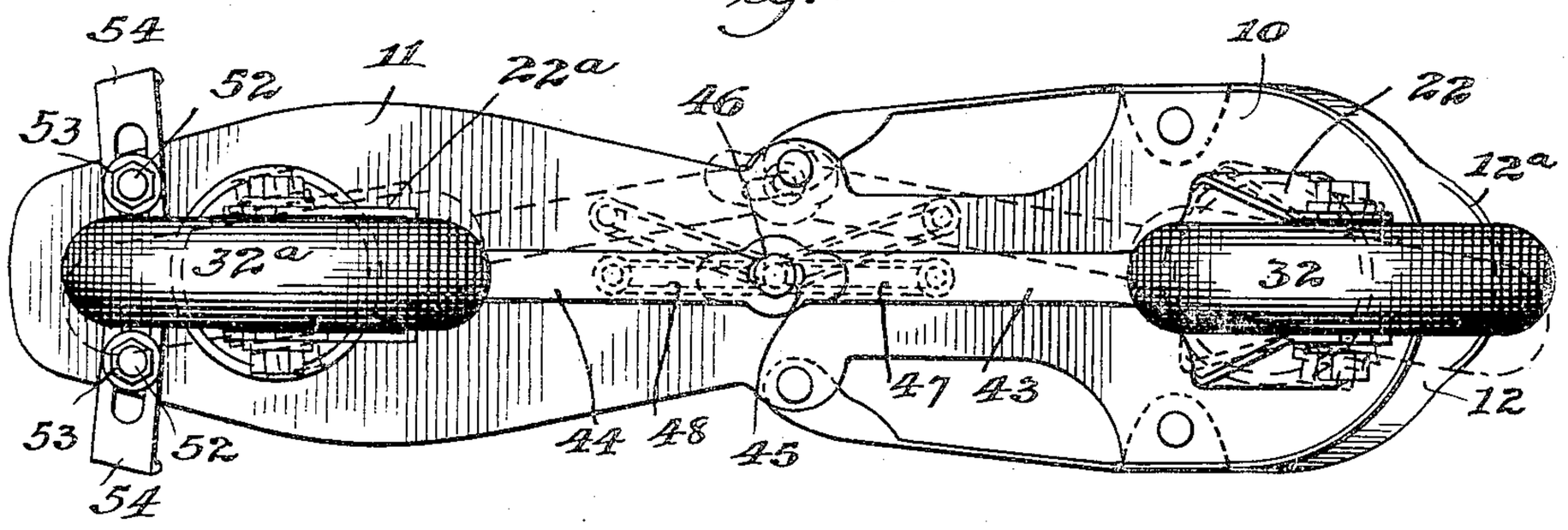


Fig. 3.

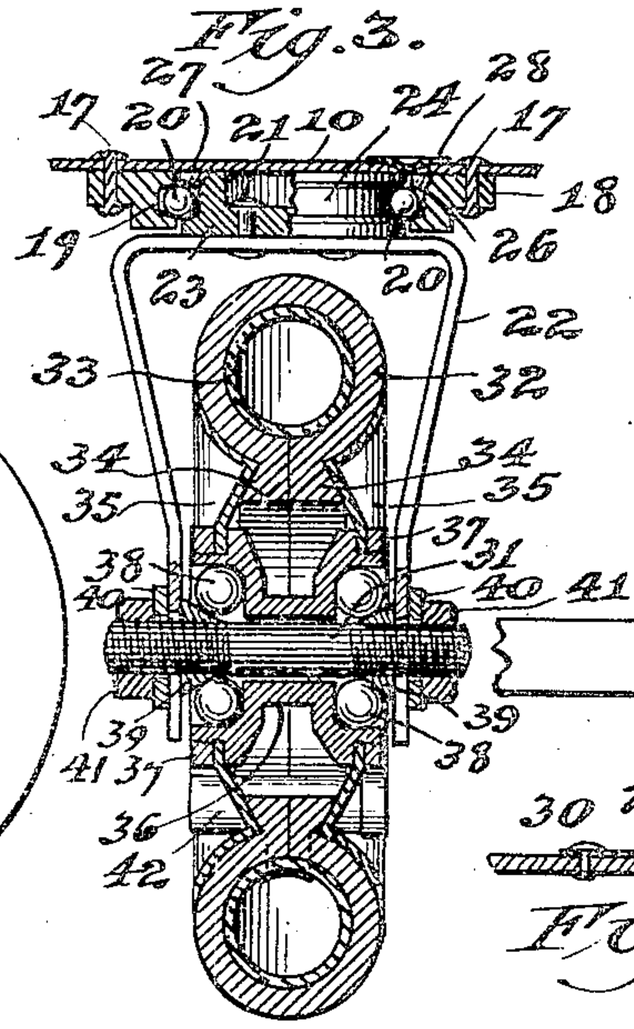


Fig. 4.

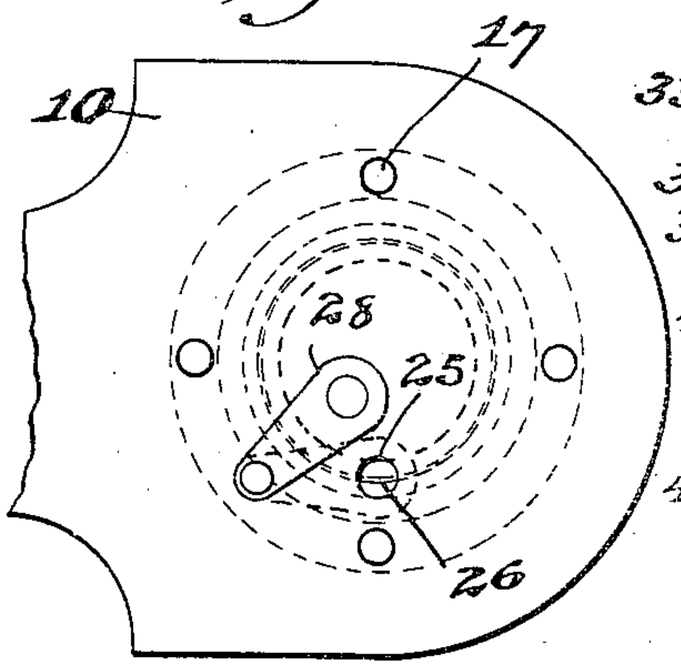


Fig. 5.

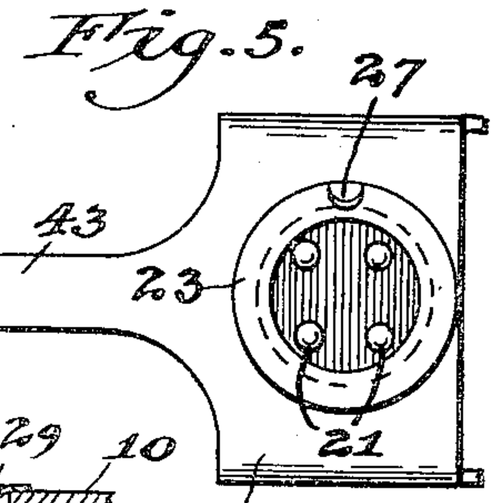
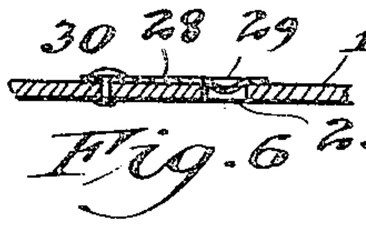


Fig. 6



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UNITED STATES PATENT OFFICE.

ANDREW J. KENNEDY, OF CHICAGO, ILLINOIS.

SKATE.

979,169. Specification of Letters Patent. Patented Dec. 20, 1910.

Application filed January 16, 1909. Serial No. 472,735.

To all whom it may concern:

Be it known that I, ANDREW J. KENNEDY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Skates, of which the following is a specification.

This invention relates to roller skates, and more particularly to that type of roller skates employing a single central front and rear roller pivotally mounted relatively to the toe and heel-plates and connected to each other in such a manner that an angular movement of the rear roller imparts an angular movement in the opposite direction to the front roller to facilitate movement in a curved line.

The main object of the invention is to provide an improved skate of this type, more particularly in the directions of greater strength and durability and easy running qualities; and to this end the invention resides in a novel mounting of and connection between the front and rear rollers, both of which operate on the caster principle. The rear roller is so mounted as to constitute a trailing caster; that is, the horizontal axis of the roller is located in rear of the vertical axis of the roller-frame relative to the direction of travel, while the front roller is mounted with its horizontal axis vertically beneath the vertical axis of its frame, and the two pivotal frames are connected in such a manner that the angular swing of the rear roller imparts an angular swing in the opposite direction to the front roller, the purpose and advantage of thus mounting the rollers being to facilitate the movement of the skate when moving in a curved direction of travel.

The invention also consists in a novel construction of anti-friction pivotal bearing for the roller-frame applicable to either or both of the front and rear rollers.

My invention will be readily understood when considered in connection with the accompanying drawings showing practical mechanical embodiments of the several features thereof, and in which—

Figure 1 is a side elevational view of the complete skate shown as applied to the foot of the wearer. Fig. 2 is a bottom plan view of the skate, with the inclined position of the rollers indicated in dotted lines. Fig. 3 is a central vertical transverse section through one of the rollers and the pivotal bearing of its frame, the latter being partly in elevation. Fig. 4 is a top plan view of the heel-plate of the skate illustrating a means for applying and withdrawing the balls of the antifriction bearings between the roller frame and the heel-plate. Fig. 5 is a top plan view of the supporting frame of the rear roller, showing one of two coöperating bearing members which constitute a raceway for the balls mounted therein. Fig. 6 is a detail in cross-section through the heel-plate or toe-plate and illustrating a closure for the opening through which the balls are introduced to the raceway.

Referring to the drawings, 10 designates the heel-plate and 11 the toe-plate of the skate, which are herein shown as integral or continuous with each other. Riveted to the sides and rear of the heel-plate is a thin metal heel-guard 12 having integral upwardly extending arms 13 to which is pivoted an ankle-brace 14 carrying at its upper end a circlet 15 adapted to embrace the ankle of the wearer. Pivotally connected to the lower end of the ankle-brace 14 and to the heel-guard 12 is a brake 16 adapted to coöperate with the rear roller. This ankle-brace and brake, however, form no part of my present invention, but constitute the subject-matter of Letters Patent No. 922,774, granted to me May 25, 1909.

Secured to the under side of the heel-plate 10 as by rivets 17 is an annular bearing member 18, best shown in the detail view Fig. 3, said annular bearing member being formed on its inner periphery with a groove or channel 19 forming in part a raceway for a series of antifriction balls 20. Secured as by rivets 21 to the upper horizontal member of a yoke-shaped truck or carrying frame 22 of the rear roller is a coöperating circular bearing plate 23, which is formed in its outer periphery with an annular groove or channel 24 forming a mating raceway for the ball bearings 20, said bearing member 23 fitting within the annular bearing member 18. The introduction and removal of the balls 20 is effected by forming through the heel-plate and toe-plate (the construction of the two being identical so far as this feature is concerned), Figs. 4 and 6, a hole 25 large enough to admit the balls, said hole registering with a semi-circular notch 26 formed in the upper flange of the bearing member 18, and by forming through the upper flange of the rotary bearing member 23 a semi-circular notch

27 which, when the bearing member 23 is rotated to a certain position, registers with the semi-circular notch 26, so that both of said notches lie face to face beneath the circular aperture 25. The notch 27 is so located that, to bring it into registration with the notch 24 and hole 25 necessitates a turning of the truck 22 to a position which it would never assume when the skate is in use, and hence there is no danger of the balls being lost when the skate is in service. A spring closure 28 having a depressed part 29 is pivoted at 30 to the heel or toe-plate and can be swung to a position to either close or open the hole 25, as clearly shown in Fig. 4.

The yoke-shaped truck or roller frame 22 has rearwardly slanting and inwardly converging arms, as shown in Figs. 1 and 2, between the forked lower ends of which is mounted the rigid axle 31 of the rear roller. This latter may be, within the broad purview of the invention, any suitably formed and constructed roller for the purposes of a roller skate rotatably mounted upon the axle 31; but in the accompanying drawings I have illustrated and will now describe a roller which I have specially devised and which I preferably use in combination with the other features of the invention. This roller comprises an annular hollow body adapted to contain air under pressure to give the roller the character of a pneumatic tired wheel, this annular body comprising, as shown, an outer tire casing 32 of the general form and character of automobile tires now in use, with an inner air-holding tube 33. The base or inner periphery of the tire-body 32 is longitudinally split and formed with a pair of thickened outwardly flaring integral flanges 34, which are securely clamped by means of a pair of annular metal disks 35, so shaped as to snugly fit the contour of the tire-body 32 and its flanges 34. These metal disks 35 are mounted on the reduced and threaded ends of a central hub member 36 through which the axle 31 passes, and are secured thereon by nuts 37, the outer faces of which latter lie substantially flush with the reduced ends of the hub so as to present no interference with the arms of the yoke 22. The hub 36 is internally chambered at its ends to form bearings for two annular series of balls 38, these latter being confined by bearing cones 39 mounted on the threaded ends of the axle 31 and confined on their outer faces by the arms of the yoke 22, the bearing being secured in properly adjusted position by washers 40 and nuts 41. It will be observed that by reason of the relatively small diameter of the roller as compared with the diameter of its hub, the securing of the annular disks 35 in position by the nuts 37 effects a very strong and secure clamping effect on the inner peripheral portion of the tire-body. Inflation of the tire is effected by a T-shaped nipple 42, the horizontal portion of which lies transversely of the roller, passing through the clamping disks 35 while its vertical stem pierces the inner periphery of the tire. My invention, however, is not concerned with any particular means for inflating the tire.

The foregoing description of the parts shown in Figs. 3 to 6, inclusive, may be assumed to apply to the rear roller of the skate; but the detail construction of the front roller, which I designate as 32^a and the means whereby it is swivelingly mounted on the under side of the toe-plate, is identical in all respects with the foregoing description of the rear roller, with the exception that the axle 31^a of the front roller is mounted vertically beneath the vertical axis of the upper bearing on the toe-plate instead of in rear thereof, as in the case of the rear roller, and, for the sake of a symmetrical appearance, the arms of the yoke or truck 22^a of the front roller are at their upper ends slightly offset in the direction of the center of the skate, so as to cause them to incline in a direction opposite to the inclination of the arms of the yoke 22. Mechanically, however, this is not necessary, and the arms of the yoke 22^a may be made vertical, if desired. Integral with or connected to the yokes 22 and 22^a are inwardly extending arms 43 and 44, respectively, the meeting ends of which overlap, as shown. The arm 44, as herein shown, is provided with a longitudinally extending slot 45 (Fig. 2), through which is passed a headed pin or screw 46 that is tapped or otherwise secured into the overlapping end portion of the other arm 43, thus forming a joint between said arms permitting a limited connected side-wise movement of both. It will be seen that by reason of this connection between the forward and rear trucks of the roller, a swiveling movement of the rear roller between a position parallel with the longitudinal axis of the skate and a position at an angle thereto will impart to the front roller a similar movement to the same extent but in an opposite direction, as clearly indicated in Fig. 2. In order to recenter both rollers when the foot is raised from the floor, I provide any suitable elastic device tending normally to maintain the arms 43 and 44 in alinement while permitting their deflection when the skate is in engagement with the floor, such device as herein shown comprising a pair of rubber bands 47 and 48, both anchored at one end to a stud 49 in the toe-plate of the skate and at their other ends connected to studs 50 and 51 on the arms 43 and 44, respectively.

To the under side of the toe-plate 11 are secured by short bolts 52 and nuts 53 slotted adjustable sole-grips 54. These sole-grips

or clamps have heretofore, so far as I am aware, been provided with key-operated adjusting means whereby they may be opened to permit the positioning of the sole of the shoe between them, and then drawn together upon the edges of the latter to clamp the same. In the present device I obviate the necessity of a clamp requiring to be loosened and tightened each time the skate is removed or applied, through the employment of a form of heel-guard such as shown at 12 having an upwardly and outwardly inclined rear wall with an outwardly curved upper edge, as shown at 12ª, such construction of heel-guard permitting the toe of the shoe to be introduced by a sliding movement between the clamps 54 when set to a proper position to fit the shoe, so that, by then forcing the heel down into engagement with the heel-plate, the shoe is thus forced forwardly into snug engagement with the clamps or grips 54, thus requiring only the fastening of the usual instep strap 55, and the lacing of the meeting ends of the circlet 15, where employed, to complete the secure application of the skate to the shoe.

I have found by experimenting that the herein described manner of mounting the rollers in the heel- and toe-plates so that they may swivel and accommodate themselves, caster-fashion, to the movement of the skate in a curved direction, greatly facilitates the ease with which such a movement can be made. The rear roller, being of the trailing caster type, constitutes, of course, the controlling roller; the front roller being so pivoted as to be neutral, and being entirely controlled as to its swiveling movement by the annular movement of the rear roller imparted through the connecting arms 43 and 44 of the roller trucks. Good results are obtained where the rear roller alone is swiveled so as to operate on the principle of a trailing caster, but the most perfect and satisfactory results are obtained by also swiveling the front roller and rendering it subject to the control of the rear roller in respect to its direction of movement or travel. Where both the bearings of the rollers themselves, and the vertical bearings of their trucks are made of the antifriction character shown and described, an exceedingly easy running skate is produced; and I have further found by repeated tests that for the purpose of a cushion effect, the employment of a pneumatic tire on the rollers themselves yields results that are superior to the employment of a solid rubber or similar resilient tire, the latter exhibiting a tendency to stick and retard the easy gliding movement of the skate, while the former facilitates it.

I claim:

1. In a roller skate, the combination with a foot-supporting plate, of a front roller and a truck in which the same is rotatably mounted, said truck being swiveled to and beneath the toe portion of said plate on an axis vertically above the axis of rotation of said roller, a rear roller and a truck in which the same is rotatably mounted, said last-named truck being swiveled to and beneath the heel portion of said plate on an axis in front of the axis of said rear roller, and a connection between said trucks whereby an angular movement of the rear truck effects an angular movement of the front truck in an opposite direction, substantially as described.

2. In a roller skate, the combination with a foot-supporting plate, of a front roller and a truck in which the same is rotatably mounted, said truck being swiveled to and beneath the toe portion of said plate on an axis vertically above the axis of rotation of said roller, a rear roller and a truck in which the same is rotatably mounted, said last-named truck being swiveled to and beneath the heel portion of said plate on an axis in front of the axis of said rear roller, a connection between said trucks whereby an angular movement of the rear truck effects an angular movement of the front truck in an opposite direction, and means normally maintaining both rollers in a common plane coincident with the vertical plane of the longitudinal median line of said plate, substantially as described.

3. In a roller skate, the combination with a roller truck, and a foot-supporting plate, of an antifriction bearing whereby the former is swiveled to the latter, comprising an annular bearing member secured to the under side of said plate and formed with a channeled inner periphery, a circular bearing member secured to said truck and lying within said annular bearing member and formed with a channeled periphery, and a series of balls in the registering channels of said bearing members, substantially as described.

4. In a roller skate, the combination with a roller truck, and an apertured foot-supporting plate, of an antifriction bearing whereby the former is swiveled to the latter comprising an annular bearing member secured to the under side of said plate and formed with a channeled inner periphery having a notch in the upper wall of the channel directly beneath the aperture of said plate, a circular bearing member secured to said truck and adapted to lie within said annular bearing member and formed with a channeled periphery having a notch in the upper wall thereof, and a series of balls in the registering channels of said bearing members, substantially as described.

5. In a roller skate, the combination of a roller, a yoke in which said roller is rotatably mounted, a foot-supporting plate, and means for rotatably mounting said yoke on

the under side of said plate comprising an annular bearing member secured to the under side of said plate and formed with a channeled inner periphery of a diameter greater than the length of the roller hub, and a circular bearing member secured to said yoke and lying within said annular bearing member and formed with a channeled periphery, and a series of balls in the registering channels of said bearing members and locking the latter together, substantially as described.

6. In a roller skate, the combination of a roller, a yoke formed with an upper transverse member and a pair of downwardly convergent depending arms in and between the lower ends of which said roller is rotatably mounted, a peripherally-channeled circular bearing member rigidly mounted on the upper transverse portion of said yoke, a foot-supporting plate, an annular bearing member secured to the under side of said plate and having a channeled inner periphery surrounding said circular bearing member, and a series of balls in the registering channels of said bearing members and locking the latter together, substantially as described.

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