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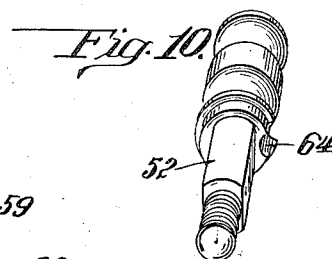
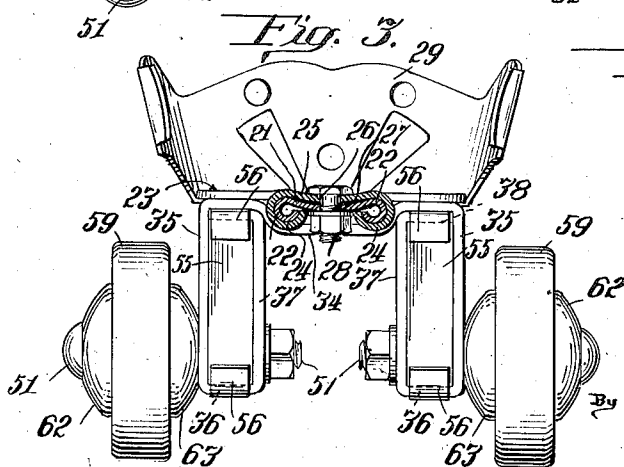
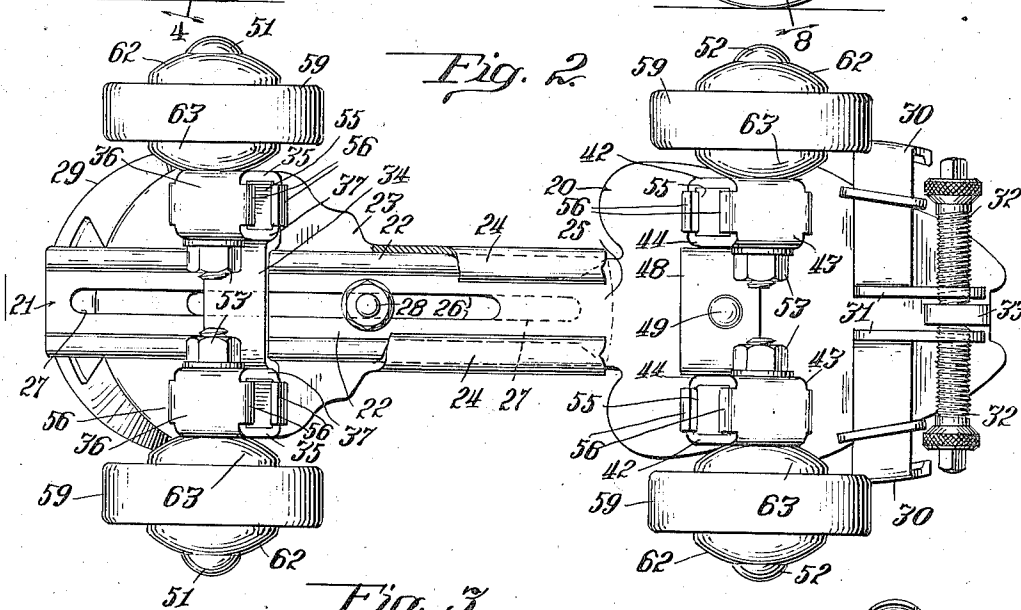
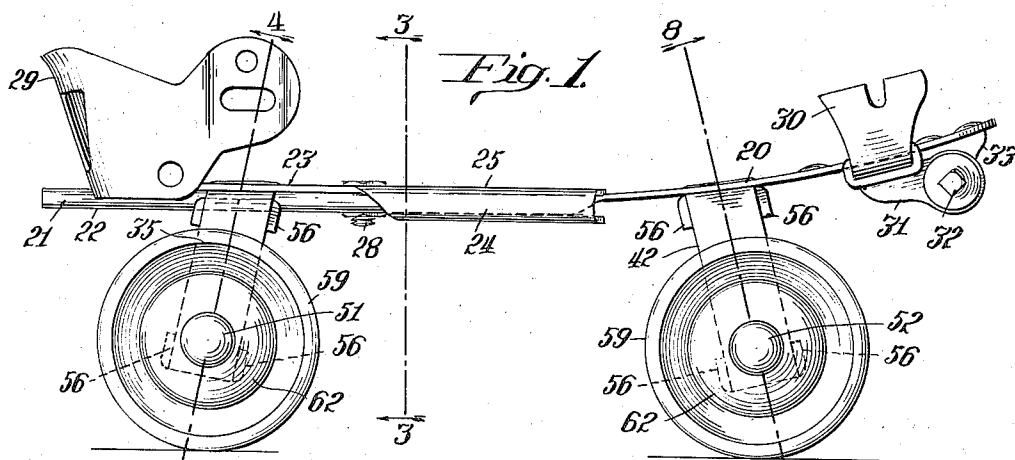
E. J. SCHMIDT

2,079,185

ROLLER SKATE

Filed March 5, 1934

2 Sheets-Sheet 1



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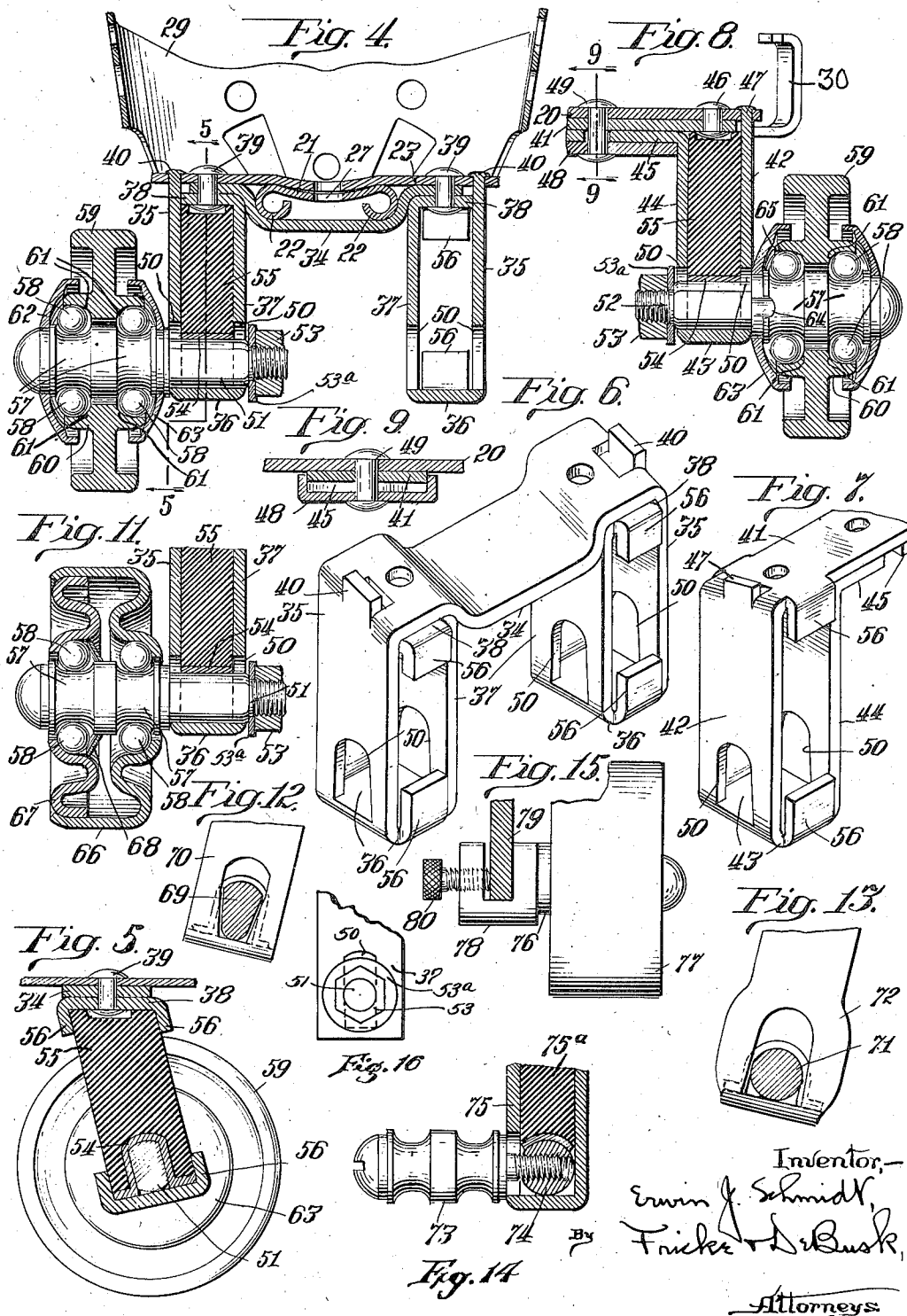
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UNITED STATES PATENT OFFICE

2,079,185

ROLLER SKATE

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Application March 5, 1934, Serial No. 714,135

12 Claims. (Cl. 208—179)

My invention relates to roller skates and has for its principal object the provision of a new and improved form and arrangement of parts by reason of which a much improved mounting for the supporting wheels or rollers shall be provided whereby there shall be a greatly increased facility for turning or weaving on the part of a skater while at the same time a sense of security is felt by the skater; and whereby the construction of the skate is greatly simplified and made substantially cheaper and better.

To these ends, it is one of the objects of my invention to provide an improved arrangement by which the separate wheels are controlled individually so as to make it possible to change the position of one of the wheels with respect to the foot plate without any reciprocal movement of any other wheel, so that the wheels are free to move as occasion may require at opposite sides of the device independently of each other for meeting varying conditions of the skating surface and varying conditions of skating. It is one of my objects to accomplish this result both by reference to the mounting of the axle for the wheel and also by reference to the connection between the axle and the wheel or roller.

For accomplishing these results, it is one of the objects of my invention to provide an improved arrangement of bearing means by reason of which each of the wheels is afforded an effective side bearing on the axle and also an effective thrust bearing in both directions, all by the use of two sets of bearing balls, the arrangement being preferably such that the wheels are enabled to swing slightly in any direction from the normal precisely transverse position so as to bring into operation the thrust bearing factors whereby the wheel even in such canted position is afforded full anti-friction mounting characteristics.

It is another object of my invention to improve devices of this type in sundry details hereinafter pointed out. The preferred means by which I have accomplished my several objects are illustrated in the drawings and are hereinafter specifically described. That which I believe to be new and desire to cover by Letters Patent is set forth in the claims.

In the drawings,—

Fig. 1 is a side view of the preferred form of my improved skate;

Fig. 2 is a bottom plan view of the skate shown in Fig. 1;

Figs. 3 and 4 are vertical cross sections taken respectively at the line 3—3 and the line 4—4 of Fig. 1;

Fig. 5 is a vertical cross sectional view taken at line 5—5 of Fig. 4;

Fig. 6 is a perspective view of the bracket by which the rear wheels of the skate are mounted in position;

Fig. 7 is a perspective view of a portion of the bracket structure by which the front wheels or rollers are mounted in position;

Fig. 8 is a vertical cross sectional view taken at line 8—8 of Fig. 1;

Fig. 9 is a vertical cross sectional view taken at line 9—9 of Fig. 8;

Fig. 10 is a perspective view of the axle member shown in Fig. 8;

Fig. 11 is a central vertical sectional view through a modified form of wheel or roller mounted on the lower end of a bracket;

Figs. 12 and 13 are inside face views of the lower end portions of modified forms of bracket, showing the axle member in cross section in position therein;

Fig. 14 is a side view of a modified form of axle member and mounting means therefor;

Fig. 15 is an edge view of a supporting wheel or roller mounted by means of a modified form of axle member upon the runner of an ice skate a fragmentary portion of which is shown in cross section; and

Fig. 16 is an end view, looking toward the left in Fig. 4 or 11, showing the relation of the axle member and the parts carried thereon with respect to its supporting bracket.

Referring now to Figs. 1 to 10 inclusive, in which corresponding parts are indicated by the same reference characters, 20 indicates a front foot plate having a long narrow arm 21 projecting rearwardly therefrom, the side edge portions of the arm 21 being rolled to provide beads at opposite sides, as is best shown in Fig. 4, such beaded portions being indicated by reference numerals 22. The arm 21 extends into a socket on the front end of a rear foot plate 23, such socket being formed by rolled bead portions 24 formed upon the side edges of a forwardly extending arm 25 formed integrally with the rear foot plate 23. The arm 25 and foot plate 23 are provided with a long slot 26 therein which registers with a slot 27 in the arm 21, the slot 27 being of considerably greater length than that of the slot 26 in the arrangement shown. A bolt 28 passing through the slots 26 and 27 serves when tightened in position to hold the front and rear foot plates rigidly in any desired adjusted position with respect to each other.

The rear foot plate 23 is provided with a sheath

or housing member 29 of sheet metal of any approved type as is usual in devices of this kind. The front foot plate 20 in turn is provided with clamps 30 which are slidable transversely of the skate, each of the clamps at its inner end being provided with a forwardly extending arm 31. Said arms 31 are adjustably connected together by means of a double screw device 32 which has a bearing at its middle point in a bracket 33 depending from the plate 20. The screw 32 is provided with oppositely acting screw threads at opposite end portions so as to move the clamps inwardly and outwardly in unison upon rotation of the screw.

The bracket means for mounting the rear wheels or rollers upon the foot plate 23 is made from a strip of sheet metal stamped and pressed into shape as shown in Fig. 6. This bracket arrangement comprises a cross bar portion 34 which is offset downwardly at its middle portion. At each end of the cross bar, the metal strip from which the bar is made turns downwardly in the form of an upright 35 which at its lower end is turned inwardly providing a short cross bar 36 from which rises a second upright 37 opposite the upright 35 but in spaced relation thereto, the uprights 37 being provided at their upper ends with outwardly turned cross bars 38 which are arranged in face engagement with the cross bar 34. This bracket device is securely mounted upon the rear foot plate 23 so as to depend therefrom, being secured to the plate by means of rivets 39, reinforced by short arms 40 struck from the metal of the strip and extending upwardly through openings in the plate 23 so as to have their upper ends riveted thereto, as is clearly shown in Fig. 4.

As is clearly shown in Fig. 4, the uprights 35 and 37 comprising the bracket at each side of the skate stand at right angles to the plate 23 transversely of the plate. As is clearly shown in Fig. 1, said uprights are in diagonal position with respect to the plate 23 longitudinally of the skate so as to give the brackets at opposite sides of the skate a backward trend.

The bracket structure provided for supporting the wheels or rollers below the front foot plate 20 is likewise formed of a strip of sheet metal. As is best shown in Figs. 7 and 8, this bracket comprises a cross bar portion 41, integrally formed uprights 42 depending from the ends of the portion 41, inwardly directed cross bar portions 43 at the lower ends of the upright portions 42, upwardly directed uprights 44 formed at the inner ends of the cross bar portions 43, and inwardly directed arms 45 which engage the bottom face of the cross bar portion 41. The bracket member is secured in position upon the foot plate 20 by means of rivets 46 which extend through the cross bar 41 and the plate 20, being reinforced by short arms 47 formed on the bracket member and extending unwardly through suitable openings in the plate 20 so as to have their upper ends riveted above the plate 20 as is clearly shown in Fig. 8. The mounting of the bracket member upon the plate 20 is strengthened and reinforced by a clip member 48, as is best shown in Fig. 9, such clip member being secured in position by means of a rivet 49 extending through the clip and an opening in the plate 20. As is best shown in Fig. 8, the uprights 42 and 44 stand at right angles to the plate 20 transversely of the skate but have a slight forward trend longitudinally of the skate as is shown in Fig. 1 by

reason of the fact that they are in slightly oblique position with respect to the cross bar member 41 and the plate 20.

As is best shown in Fig. 4, the downward offsetting of the middle portion of the cross bar portion 34 of the rear bracket enables the arm 21 of the front foot plate to project backwardly between the bracket and the rear foot plate 23 and serves also to provide a rigid bearing for such arm 21 for reenforcing the connection between the foot plate members. By my improved arrangement comprising the socket formed by the turned over portions 24 on the arm 25 and the support provided by the cross bar portion 34 in rear of such socket arrangement, I have provided a very strong construction which is adapted to stand up under long continued hard usage. By this arrangement, the foot plates are very readily adjustable longitudinally with respect to each other throughout a very long range.

By my improved arrangement as above described, I have provided two depending brackets at opposite sides of the skate at each end portion of the skate, such brackets being oppositely disposed transversely of the skate and being rigidly connected together so as to have a mutual reenforcing effect. Each of the brackets comprises two oppositely disposed uprights in spaced relation to each other rigidly connected together at their lower ends, each bracket being in the form of a closed loop. The spaced uprights comprising each of the brackets are provided at their lower ends with openings 50 therethrough oppositely disposed with respect to each other so as to receive an axle member 51 therethrough as shown in Fig. 4 or an axle member 52 therethrough as shown in Fig. 8. As is best shown in Fig. 5, the axle member 51 is flattened by the removal of metal at its opposite faces at the portion extending through the bracket, being provided with an enlarged shoulder portion adapted to limit the movement of the axle member toward the right in Fig. 4 into position in the bracket. This flattened shank portion is of such length as to extend slightly beyond the inner face of the upright 37, the end portion of the axle member being of reduced size and being provided with screw threads for the reception of a securing nut 53 thereon, a washer 53a preferably being placed on the member 51 behind the nut 53. By reason of the slight excess in length of the shank portion, the axle member is free to slide vertically along the upwardly elongated openings 50, and is adapted to have a slight angular movement with respect to the bracket. The washer 53a and the nut 53 constitute shoulder means on the axle member and limit endwise and angular movement of the axle member with respect to the bracket. Above the axle member 51, I have provided a wear plate 54 of sheet metal which is preferably secured in position in the lower end of a block 55 of compressible rubber which is inserted in the loop between the axle member and the rivet 39. The block 55 is adapted to serve as a cushioning member for the axle with respect to the bracket serving normally to hold the axle member in its lowermost position in the bracket and serving also to afford strong resistance with respect to angular motion of the axle member with respect to the bracket. In the arrangement shown, the compressible member 55 is held in position within the loop by means of lugs 56 formed integrally with the bracket member.

As is clearly shown in Fig. 4, the axle member 51 is provided with two circumferential grooves 57

thereabout in spaced relation to each other longitudinally of the member, each of said grooves having rounded shoulders at its sides separated by a short cylindrical portion. In each of said grooves I have provided a series of anti-friction balls 58 which are adapted to move freely longitudinally of said cylindrical portion without moving out of the groove. About the two sets of balls 58, I provide a wheel or roller 59 which in the arrangement shown is turned from a solid integral piece of metal, the hub portion 60 having outwardly facing shoulders 61 which are located opposite the inner wall portions of the grooves 57, such shoulders 61 merging into short cylindrical portions longitudinally of the axle member opposite the cylindrical portions of the grooves. A cap 62 is secured upon the outer end of the axle member 51 for protecting the outer series of balls 58, and a cap 63 is secured upon the axle member adjacent to the flattened portion of said member for protecting the other set of balls 58. The arrangement is such that when the balls 58 are centered in the grooves 57 the balls and the wheel 59 are out of contact with the caps 62 and 63.

In the arrangement shown in Fig. 4, the parts are of such size and are so arranged with respect to each other as to be capable of being inserted into operative position without the removal of any of the retaining parts. For the assembly of the wheel and axle, the axle member is first inserted through the central opening of the wheel from the right in Fig. 4 to a point slightly further to the left in said figure than the position as shown. One entire set of balls 58 is then readily inserted from the left, whereupon the axle member is moved to the limit of its motion toward the right in said Fig. 4 for the insertion of the second series of balls. The arrangement is such that all but a limited number of the second set of balls can be readily inserted from the right as shown in said Fig. 4, and such that the last of the limited number to be inserted can be forced into position by the application of a limited pressure thereon, the pressure required upon the ball last to be inserted being sufficient for insuring that the ball will not be removed inadvertently during the operation of the bearing. It will be understood, of course, that after the complete assembly of the arrangement as shown in Fig. 4 one or more of the balls can be forced out of position, whereupon the remaining balls can be removed without any substantial pressure thereon by a slight shifting of the axle member with respect to the wheel.

As an alternative arrangement, the construction may be such that the second set of balls to be inserted may be placed in position without the application of pressure thereto when the axle member is moved to the limit of its motion toward the right in said Fig. 4, the arrangement being such preferably that when the axle member is centered in position with respect to the shoulders 61 of the wheel the balls 58 will be normally retained without danger of accidental removal. In such case, the cap 63 is relied upon for holding the balls from escape when the axle member is moved to the limit of its motion toward the right in said Fig. 4.

With the parts in the arrangement as shown in said Fig. 4, the two sets of balls 58 serve to provide an admirable anti-friction bearing with respect to side pressure on the axle member 51. At the same time, the two sets of balls provide anti-friction thrust bearings for the axle member

with respect to the wheel, one set of balls acting as the thrust bearing with respect to pressure longitudinally of the axle member in one direction and the other set of balls being effective with respect to pressure longitudinally of the axle member in the opposite direction. The arrangement is such that the wheel can be tilted slightly or canted from the directly transverse position with respect to the axle member without having any substantial effect upon the effectiveness of the supporting means as an anti-friction bearing, this result being attained by reason of the fact that the balls 58 can shift slightly lengthwise of the axle member by reason of the excess width of the grooves as compared with the width of the balls. By reason of this arrangement, a skater is enabled very readily and easily to change direction and to effect what is termed weaving in his forward movement on the skate.

The arrangement shown in Fig. 8 in connection with the axle member 52 is the same as that above described in connection with the arrangement shown in Fig. 4 except that the shoulder forming the outside wall of the groove at the left in said Fig. 8 is somewhat higher than that of the corresponding shoulder of the axle member 51 above described. The arrangement is such that it is necessary that the last of the second set of balls to be inserted must be inserted through a notch 64 at one side of the axle member, such notch 64 being turned into registration with a notch 65 in the hub of the wheel. By the use of the notches 64 and 65 and the more extensive shoulder formation in connection with the axle member 52, a smoother end thrust action of the axle member 52 toward the right is effected.

The arrangement shown in Fig. 11, is similar to that shown in Fig. 4, except that a stamped sheet metal wheel is employed in lieu of the turned wheel of the Fig. 4 arrangement, and that the wheel of Fig. 11 is provided with inwardly facing shoulders in lieu of the outwardly facing shoulders 61 of the wheel 59. As is clearly shown in said Fig. 11, the wheel comprises a member 66 formed of sheet metal and a second member 67 also formed of sheet metal and extending into the open end of the cylindrical portion of the member 66.

For the assembly of the wheel and axle as shown in Fig. 11, the axle member is inserted through the wheel member 66 to a position slightly farther toward the left than that shown in said figure, and the balls 58 are inserted into position in the groove 57 toward the right. The axle member 51 is then moved to the limit of its motion toward the right in said Fig. 11, and a conical washer 68 is slipped into position upon the axle member 51 adjacent to the inner edge of the groove 57 at the left in said figure, said washer 68 being of such size as to be held frictionally in position. The balls 58 at the left are then placed in position, being supported for the assembly operation by the washer 68. The wheel member 67 is then moved into position within the straight end portion of the wheel member 66, and the parts are adjusted so as to bring the shoulder portions provided by the members 66 and 67 into the desired relation, whereupon the edge of the member 66 is spun inwardly slightly for holding the parts strongly in their assembled positions as illustrated.

In the arrangement shown in Fig. 12, an axle member 69 is shown of substantially triangular formation in lieu of the substantially square flat-

tened arrangement of the axle member 51 as shown in Fig. 5, the openings in the bracket 70 being changed correspondingly to fit.

In Fig. 13 still another modified arrangement is shown in which an axle member 71 of circular form is employed, the bracket 72 being of slightly greater width to compensate for the greater width of the axle member.

In Fig. 14 still another modified arrangement is shown, comprising an axle member 73 which is secured by means of screw threads within a substantially spherical nut 74 which is located between the sides of the bracket 75 below the compressible block 75a. In the arrangement shown in Fig. 14, the axle member 73 is capable of having a slight swinging movement with respect to the bracket, but such swinging movement is limited so as to hold the axle member in substantially horizontal operative position during use.

In the arrangement shown in Fig. 15, I have provided still another modified arrangement comprising an axle member 76 having a wheel or roller 77 mounted thereon at one end and provided at its opposite end with a clamp in the form of a yoke 78 which is adapted to fit on the lower edge of the blade 79 of an ice skate so as to hold the roller 77 in operative position with respect to said blade. A set screw 80 is provided for securing the axle member and wheel rigidly in position upon the blade. By the use of this arrangement, applicant is enabled very quickly and very easily to convert an ice skate into a roller skate without in the least injuring the skate for its initial purpose. As will be readily understood, two of the devices as shown in Fig. 15 could be employed in connection with the blade of a skate so as to provide anti-friction support for the blade, or as an alternative arrangement two of the devices as shown in Fig. 15 might be used at each end of the blade, with such devices extending in opposite directions from the blade. A similar arrangement might be used to advantage in connection with other slide runner devices such as sleds and the like.

While I prefer to employ the form of arrangement as shown in my drawings and as above described, it is to be understood that my invention is not limited thereto except so far as the claims may be so limited by the prior art.

I claim:—

1. In a roller skate, the combination of a foot plate, a bracket depending from said plate comprising two spaced uprights, an axle member engaging said uprights near their lower ends so as to swing and to move vertically with respect thereto and having shoulder means adapted by engagement with face portions of said uprights to prevent extensive swinging movement of the axle member, a compressible member located between said uprights and holding said axle member yieldingly in its lowermost position, and a supporting wheel on said axle closely adjacent to said standard.

2. In a roller skate, the combination of a foot plate, a bracket depending from said plate comprising two spaced uprights, an axle member engaging said uprights near their lower ends and adapted to have a swinging movement and a vertical sliding movement with respect thereto and having shoulder means engaging side face portions of said uprights serving to limit the swinging movement of the axle with respect to the standards, a compressible member located between said uprights and holding said axle mem-

ber yieldingly in its lowermost position, and a supporting wheel on said axle closely adjacent to said standard.

3. In a roller skate, the combination of a foot plate, a bracket depending from said plate comprising two spaced uprights and means connecting the lower end portions of said uprights in rigid relation to each other, an axle member extending through oppositely disposed openings in said uprights near their lower ends so as to swing freely in all directions and to move vertically with respect to the uprights and having shoulder means adapted by engagement with face portions of the standards to prevent extensive swinging movement in any direction, a compressible member located between said uprights and holding said axle member yieldingly in its lowermost position, and a supporting wheel on said axle member closely adjacent to said standard.

4. In a roller skate, the combination of a foot plate, a bracket in the form of a rigid loop of sheet metal depending from said plate, an axle member mounted in the lower end portion of said bracket in substantially horizontal position and movable vertically and also adapted to have a swinging movement with respect to the bracket and having shoulder means adapted by engagement with face portions of the bracket to prevent extensive swinging movement of the axle member, a compressible member located in said loop above said axle member adapted to hold said axle member yieldingly in its lowermost position and to resist vertical swinging movement of the axle member, and a supporting wheel on said axle member closely adjacent to said bracket.

5. In a roller skate, the combination of a foot plate, a bracket in the form of a rigid loop of sheet metal depending from said plate, an axle member mounted in substantially horizontal position in openings in the side walls of the loop near its lower end and movable vertically and also adapted to have a swinging movement with respect to the bracket, a block of compressible rubber located in said loop above said axle member adapted to hold said axle member yieldingly in its lowermost position, shoulder means removably secured on one end portion of the axle member adapted by engagement with side face portions of the bracket to hold said axle member from swinging out of substantially horizontal position, and a supporting wheel on said axle member closely adjacent to said standard.

6. In a roller skate, the combination of a foot plate, two axle members, means for holding said axle members normally in substantial alignment with each other below said plate in transverse position with respect thereto adapted to permit either of said axle members to move vertically with respect to said plate independently of the other axle member and to permit either of said axle members to have a slight swinging movement from the directly transverse position independently of the other axle member, and a supporting wheel mounted on each of said axle members.

7. In a roller skate, the combination of a foot plate, two axle members, means for mounting said axle members normally in substantial alignment with each other below said plate in transverse position with respect to the plate, a compressible member interposed between each of said axle members and said plate adapted to hold said axle member yieldingly in its lowermost position independently of the other axle member, and sup-

porting wheels on said axle members respectively.

8. In a roller skate, the combination of a foot plate, two brackets depending from said plate at opposite sides thereof, two axle members mounted in substantial alignment with each other transversely of said plate on said brackets respectively so as to swing and to move vertically with respect to the brackets, a compressible member interposed between each of said axle members and said plate serving to hold the axle member yieldingly at its lowermost position, means on each of said axle members adapted by engagement with the bracket on which said axle member is mounted to hold said axle member from swinging out of its substantially transverse position, and supporting wheels on said axle members respectively.

9. In a roller skate, the combination of a foot plate, two brackets depending from said plate at opposite sides thereof, a cross bar connecting said brackets rigidly together below said plate for reinforcing said brackets transversely with respect to each other, two axle members mounted on said brackets in substantial alignment with each other below said plate in transverse position with respect thereto, compressible members interposed between said axle members respectively and said plate adapted to hold said axle members yieldingly in their lowermost position independently of each other and supporting wheels on said axle members respectively.

10. In a roller skate, the combination of a foot plate, two brackets depending from said plate at opposite sides thereof, a cross bar connecting said brackets rigidly together below said plate for reinforcing said brackets transversely with respect to each other, two axle members mounted on said brackets in substantial alignment with each other below said plate in transverse position with respect thereto, a compressible member inter-

posed between each of said axle members and said plate adapted to hold said axle member yieldingly in its lowermost position independently of the other axle member, means on each of said axle members adapted by engagement with the bracket on which said axle member is mounted to hold said axle member from swinging out of its substantially transverse position, and supporting wheels on said axle members respectively.

11. In a roller skate, the combination of a foot plate, two brackets depending from said plate at opposite sides thereof, a cross bar connecting said brackets rigidly together below said plate for reinforcing said brackets transversely with respect to each other, two axle members mounted on said brackets in substantial alignment with each other below said plate in transverse position with respect thereto, a compressible member interposed between each of said axle members and said plate adapted to hold said axle member yieldingly in its lowermost position independently of the other axle member, shoulder means on each of said axle members comprising a nut removably secured on one end portion of the axle member adapted by engagement with side face portions of the bracket on which said axle member is mounted to hold said axle member from swinging out of substantially horizontal transverse position, and supporting wheels on said axle members respectively.

12. A mounting means for a roller skate comprising in combination a cross bar formed of a metal strip, and two depending brackets formed integrally with said cross bar at its opposite ends each in the form of a closed loop extending downwardly in substantially right angular position with respect to said cross bar longitudinally of the bar but in oblique position with respect to said cross bar transversely thereof.

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