Oct. 3, 1939. F. R. MAGUIRE 2,174,990

ROLLER SKATE

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Fig. 1.

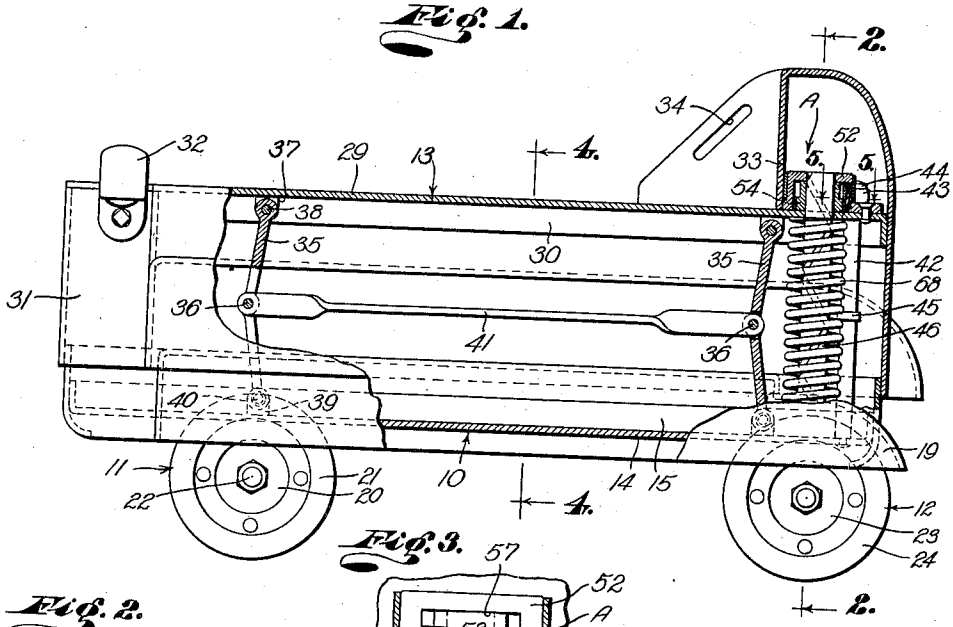


Fig. 3.

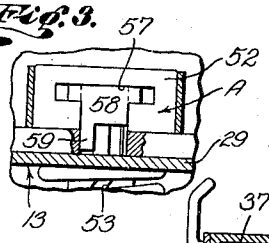


Fig. 2.

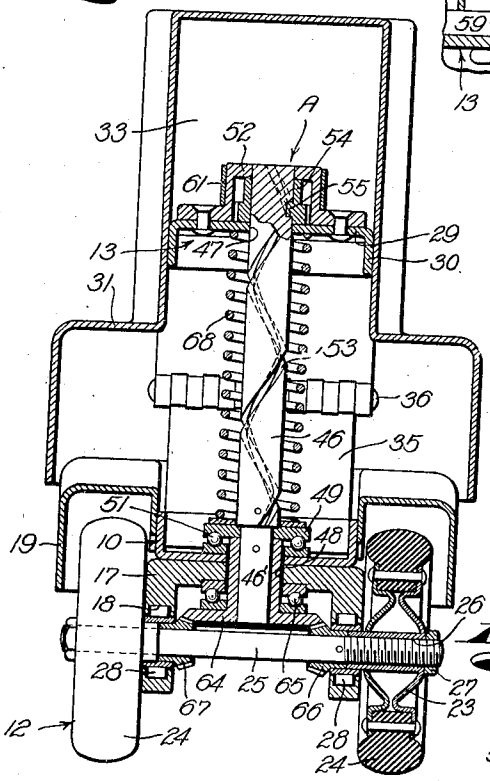


Fig. 4.

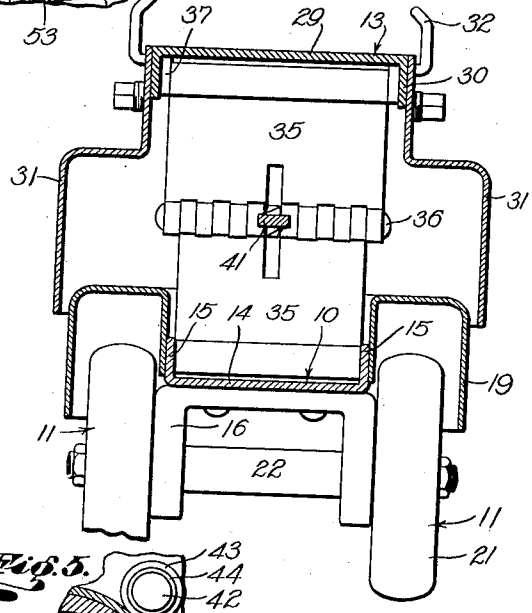
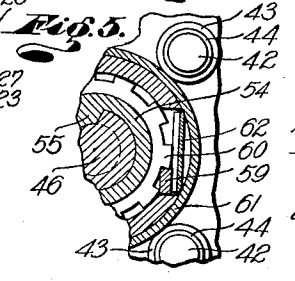


Fig. 5.



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Fig. 6.

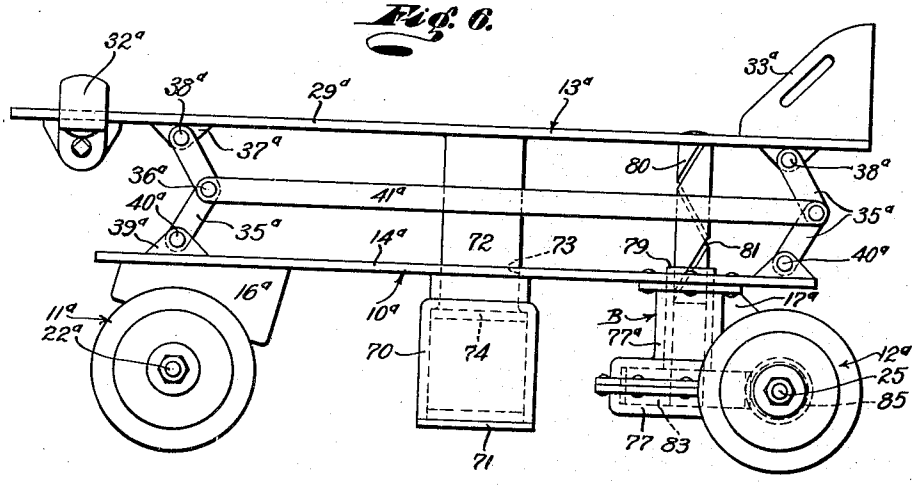


Fig. 7.

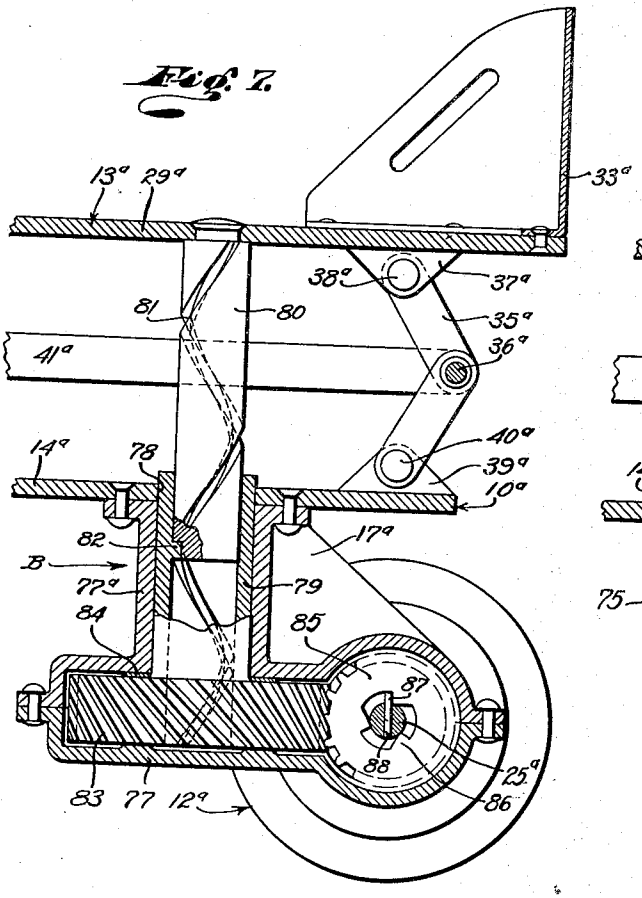
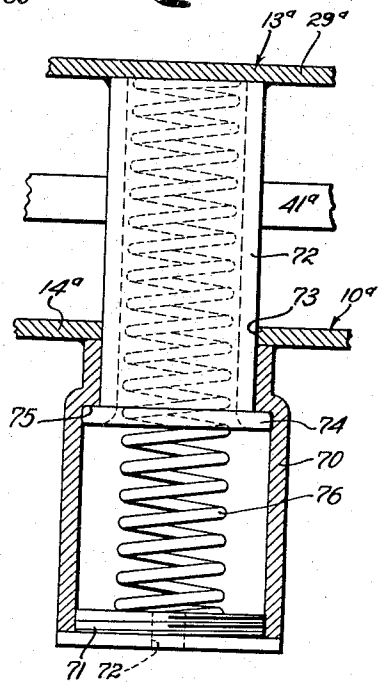


Fig. 8.



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UNITED STATES PATENT OFFICE

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ROLLER SKATE

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Application November 3, 1937, Serial No. 172,564

12 Claims. (Cl. 280—11.11)

This invention relates to skates and relates more particularly to roller skates having a driving means or a propelling means. A general object of this invention is to provide novel, practical and effective roller skates of the character referred to.

Another object of this invention is to provide roller skates having traction wheels and means whereby the wearer may employ or apply his weight to rotate the traction wheels and thus drive himself forwardly.

Another object of this invention is to provide roller skates employing drive means or propelling means for certain of the rollers or wheels whereby the wearer may propel himself forwardly by merely alternately imposing his weight on the left and right skates by what may be termed a "treading" action.

Another object of this invention is to provide roller skates of the charater mentioned in which the propelling means or wheel driving means is automatic, that is, it does not require a motor or other prime mover.

Another object of this invention is to provide roller skates of the character mentioned in which the traction wheels or driving wheels as well as the other wheels are free to rotate forwardly at all times whereby the skates may be used in the usual manner when desired.

A further object of this invention is to provide roller skates of the character mentioned that embody simple propelling mechanisms or driving mechanisms that are entirely contained in or carried by the skate body parts.

The various objects and features of my invention will be fully understood from the following detailed description of typical preferred forms and applications of my invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a side elevation of one form of skate provided by this invention with portions broken away to illustrate parts of the driving means. Fig. 2 is an enlarged vertical detailed sectional view taken as indicated by line 2—2 on Fig. 1. Fig. 3 is an enlarged fragmentary vertical detailed sectional view of the ratchet means. Fig. 4 is an enlarged vertical detailed sectional view taken as indicated by line 4—4 on Fig. 1. Fig. 5 is a detail sectional view showing part of the ratchet mechanism. Fig. 6 is a side elevation of another form of skate of the present invention. Fig. 7 is an enlarged fragmentary vertical detailed sectional view of the rear portion of the skate shown in Fig. 6 illustrating the propelling means or driving means and Fig. 8 is an enlarged fragmentary vertical detailed sectional view illustrating the means for guiding and returning the tread of the skate illustrated in Fig. 6.

In the drawings I have illustrated two typical forms or embodiments of the skate provided by this invention. It is to be understood that both forms of skates may be provided in pairs, one skate of each pair being adapted for application to the right foot and one to the left foot. In the following detailed disclosure I will describe one skate of each type or embodiment of the invention.

The form of skate of the invention illustrated in Figs. 1–5, inclusive, of the drawings includes, generally, a lower section or chassis 10, a pair of forward rollers or wheels 11 on the chassis 10, a pair of traction or driving rollers or wheels 12 on the chassis 10, an upper section or tread 13 carried by the chassis 10 for vertical movement with respect thereto and means A whereby relative movement between the chassis 10 and the tread 13 drives or rotates the wheels 12.

The lower section or chassis 10 of the skate is provided with the two pairs of wheels 11 and 12 and carries the various other parts of the skate structure. The chassis 10 is an elongate structure including a body part 14. The body part 14 of the chassis 10 is an elongate member having upturned marginal flanges 15 which lend it rigidity. An inverted U-shaped bearing bracket 16 is secured to the under side of the body part 14 adjacent its forward end to carry the wheels 11 as will be subsequently described. A similar bearing bracket 17 is secured to the under side of the body part 14 adjacent its rear end to carry or mount the traction wheels 12 as will be hereinafter described. The spaced arms of the U-shaped bracket 17 have aligned horizontal openings 18. Fenders or aprons 19 of channel-shaped cross section may extend along the opposite longitudinal sides of the body part 14. The aprons 19 may be welded or otherwise fixed to the flanges 15 and are arranged with their open sides or their channel sides facing downwardly to receive the upper portions of the wheels 11 and 12. If desired the aprons 19 may continue around the forward and rear ends of the body part 14.

The wheels 11 are the forward wheels of the skate and are free or undriven. In accordance with the broader aspects of the invention the rollers or wheels 11 may be of any type or construction. In the particular form of the in-

vention illustrated the wheels 11 include metal hubs 20 and rubber or rubber composition treads or tires 21. An axle 22 is arranged through horizontal openings in the bearing bracket 16 and the wheels 11 are rotatable on the opposite end portions of the axle. In practice the wheels 11 may be supported on the axle 22 by suitable anti-friction bearings.

The rear rollers or wheels 12 of the skate are the driving wheels or traction wheels. The wheels 12 may be similar in construction to the forward wheels 11 comprising metal hubs 23 and rubber tires 24. A shaft or axle 25 extends through the horizontal openings 18 in the bracket 17 and projects outwardly beyond the opposite sides of the bracket to carry the wheels 12. The hubs 23 preferably have openings 26 of substantial length and the axle 25 is threaded in these openings 26. Lock nuts 27 are threaded on the end parts of the axle 25 and clamp against the hubs 23 to lock the wheels 12 on the axle. Anti-friction bearings 28 are preferably provided in the openings 18 to rotatably support or mount the axle 25 on the bearing bracket 17.

The upper section or tread 13 is arranged above the skate chassis 10 and in accordance with the invention is movable vertically with respect to the chassis. The tread 13 is an elongate structure similar in size and shape to the chassis 10. In the construction illustrated in the drawings the tread 13 includes a main part or principal part 29 having depending marginal flanges 30. The part 29 has a flat upper surface against which the sole and heel of the wearer's shoe may be engaged. An apron 31 depends from the flange 30 and telescopes downwardly over the apron 19 of the chassis 10. The apron 31 is fixed to the flange 30 as by welding, or the like. The end portions of the telescoping aprons 19 and 31 may have a close sliding fit or engagement to assist in guiding the tread 13 for vertical movement relative to the chassis 10. The remaining parts of the aprons 19 and 31 may have substantial clearance to permit free movement of the tread. Suitable toe clamps 32 are provided on the forward end portion of the tread 13. The clamps 32 may be of conventional construction and may be suitably secured to the apron 31 or on the part 29 or both. A raised heel 33 is provided on the tread 13 to receive the heel portion of the wearer's shoe. The heel 33 is integral with the apron 31 and projects upwardly from the rear portion of the part 29. In the preferred construction the heel 33 is hollow or chambered to house certain parts of the means A as will be subsequently described. A slot 34 is provided in the heel 33 to receive the usual ankle strap (not shown).

The tread 13 is connected with the chassis 10 for limited vertical movement with respect thereto. The means connecting the tread 13 with the chassis 10 may comprise spaced sets or pairs of links 35. The adjacent ends of the links 35 have meshing parts as best illustrated in Fig. 4 and pins 36 extending through openings in these parts to pivotally connect the links. Lugs 37 are provided on the under side of the part 29 or on its flanges 30 and support pins 38 which pass through openings in thickened upper parts in the links 35 to pivotally connect the links with the tread 13. Similar lugs 39 are provided on the body part 14 of the chassis 10 and carry pins 40 which extend through openings in thickened lower portions in the links 35 to pivotally connect the links with the chassis. It is preferred to arrange a pair of links 35 substantially directly above the axle 22 of the forward rollers or wheels 11 and to provide a second pair of links 35 above and adjacent the plane of the axle 25 of the rear wheels 12. A link 41 is provided to connect the two spaced pairs of links 35 for simultaneous and corresponding movement to maintain the tread 13 in parallel relation to the chassis 10. The above described pins 36 pass through openings in the end portions of the link 41 to pivotally associate the link 41 with the pairs of pivotally connected links 35.

It is preferred to provide additional means to guide the movable tread 13 relative to the chassis 10. A pair of spaced posts 42 is fixed to the body part 14 of the chassis 10 and the posts project upwardly into the hollow heel 33. The posts 42 are slidably received in tubular bosses 43 on the part 29 and the engagement of the posts with the bosses assists in guiding and stabilizing the tread 13. Heads 44 are provided on the upper ends of the posts 42 and are engageable by the bosses 43 to limit the upward movement of the tread 13. Collars 45 are provided on the posts 42 and are engageable by the under side of the tread part 29 to limit the downward movement of the tread with respect to the chassis 10.

The means A is operable by downward movement of the tread 13 relative to the chassis 10 to drive or rotate the rear wheels 12 to propel the skate forwardly. The means A includes a rotatable shaft 46. The shaft 46 is arranged substantially vertically with its longitudinal axis in the same plane as the axle 25. The shaft 46 is rotatably supported on the chassis 10 and passes upwardly through on opening 47 in the part 29. Aligned openings 48 are provided in the body part 14 and the bearing bracket 16 and the shaft 46 has a reduced portion 46' extending through the openings 48. A bearing washer or thrust washer 49 is arranged on the reduced shaft portion 46' above the body part 14 and is engaged by a downwardly facing shoulder on the shaft. An anti-friction thrust bearing 51 is arranged between the washer 49 and the body part 14 to assist in rotatably supporting the shaft 46 and to transmit downward thrusts from the shaft 46 to the body part 14. The upward thrusts are transmitted from the shaft 46 to the chassis 10 by a structure to be hereinafter described.

The means A further includes mechanism for causing rotation of the shaft 46 when the tread 13 is moved downwardly relative to the chassis 10. A cap 52 is fixed to the upper side of the part 29 and the shaft 46 passes upwardly through an opening in the upper wall of the cap. The cap 52 slidably cooperating with the shaft 46 and the opening 47 receiving the shaft 46 assist in stabilizing and supporting the shaft and in guiding the tread 13 for vertical movement. A spiralled or helical groove 53 is provided in the rotatable shaft 46. A nut 54 is rotatable on the shaft 46 and is arranged within the cap 52. The nut 54 has a lug or thread 55 cooperating with the groove 53. The upper end of the nut 54 cooperates with the upper wall of the cap 52 and the lower end of the nut rests on the part 29 so that the nut moves vertically with the tread 13.

The nut 54 is held against rotation during downward movement of the tread 13 relative to the chassis 10 so that its thread 55 cooperates with the groove 53 to rotate the shaft 46. A T-shaped opening 57 is provided in the wall of the cap 52 and a correspondingly shaped ratchet

member 58 is arranged in the opening. The ratchet member 58 has a depending finger or pawl 59. Peripheral teeth 60 are provided on the nut 54 to cooperate with the pawl 59. A ring 61 surrounds the cap 52 and a spring 62 is arranged between the ring 61 and the ratchet member 58 to urge the member inwardly so that its pawl 59 cooperates with the teeth 60. The pawl 59 is offset, relative to a radial line from the shaft 46 normal to the inner face of the pawl, so that one edge of the pawl is adapted to flatly cooperate with the sides of the teeth 60 and the corners of the teeth 60 are adapted to successively cooperate with the inner side of the pawl 59 to force the same outwardly against the action of the spring 62. With the construction just described the pawl 59 is adapted to cooperate with a tooth 60 to hold the nut 54 against turning, which would otherwise result from the cooperation of the thread 55 with the groove 53, when the tread 13 moves downwardly relative to the chassis 10, and the thread 55 of the non-rotatable nut cooperating with the groove 53 rotates the shaft 46. Continued rotation of the shaft 46 in the same direction subsequent to the downward movement of the tread 13 results in rotation of the nut 54 in the said direction and the teeth 60 of the rotating nut cooperate with the inner side of the pawl 59 to force the same outwardly and thus ratchet past the pawl. During upward movement of the tread 13 the cooperation of the thread 55 with the groove 53 results in rotation of the nut 54 in the same direction as the shaft 46, assuming that the shaft is rotating and in this case the nut may turn at a higher speed than the shaft.

The means A further includes a drive between the shaft 46 and the axle 25 of the traction wheels 12. A bevel gear 64 is pinned or otherwise fixed to the reduced portion 46' of the shaft 46. The gear 64 preferably has a hub of substantial length extending through the openings 48. An anti-friction bearing 65 is arranged between the upper side of the gear 64 and the bearing bracket 17 to assist in rotatably supporting the shaft 46 and to transmit upward thrusts from the shaft and gear to the chassis. A bevel pinion 66 is pinned or otherwise fixed to the axle 25 and meshes with the gear 64. The ratio between the gear 64 and the pinion 66 may be such that the axle 25 and the wheels 12 are rotated a number of times during each down-stroke of the tread 13. In order to balance the forces on the gear 64 a bevel pinion 67 is freely arranged on the axle 25 to mesh with the gear 64 at a point diametrically opposite the pinion 66. The end or hub portions of the pinions 66 and 67 may be received in the anti-friction bearings 28. The invention may include means to counter-balance or partially counter-balance the weight of the tread 13 and to return or aid gravity in returning the tread to its upper position relative to the chassis 10. A coiled spring 68 may surround the shaft 46 and may be arranged under compression between the tread part 29 and the washer 49 to exert a yielding upward pressure on the tread.

It is believed that the operation of the form of skate of the present invention illustrated in Figs. 1–5 of the drawings will be readily understood from the foregoing detailed description. A pair of skates of the character just described may be worn in the same manner as the conventional roller skates. The user may propel himself by merely "treading" or alternately applying his weight to the left and right skates to drive the traction wheels 12 through the means A described in detail above. During the downward movement of the tread 13 of a skate relative to its chassis 10 the cooperation of the nut 54 with the shaft 46 causes rotation of the shaft and this rotation is transmitted to the axle 25 through the gear and pinion 64 and 66 so that the wheels 12 are driven or rotated. During the upward movement of the tread 13 when the user removes his weight from the skate or raises his foot the wheels 12 may continue to rotate in a forward direction and the nut 54 merely rides up on the shaft 46 and turns in the same direction as the shaft but at a higher rate. It will be understood that the skates may be operated in the same manner as the conventional roller skates but are adapted to aid in propelling the user when his weight is alternately applied to the left and right skates as described above.

The embodiment of the invention illustrated in Figs. 6, 7 and 8 of the drawings includes, generally, a chassis 10^a having pairs of wheels or rollers 11^a and 12^a, a tread 13^a supported on the chassis 10^a for vertical movement with respect thereto and means B operable by downward movement of the tread 13^a to rotate the wheels 12^a.

In this form of the invention the chassis 10^a may comprise a single elongate body part 14^a similar generally to the above described part 14. Bearing brackets 16^a and 17^a depend from the forward and rearward portions, respectively, of the chassis part 14^a. The forward rollers or wheels 11^a are rotatable on an axle 22^a carried by the bracket 16^a. The traction rollers or wheels 12^a are fixed to an axle 25^a rotatably supported on the bracket 17^a by suitable bearings. The wheels 11^a and 12^a may be of the same character as the above described wheels 11 and 12.

The tread 13^a is spaced above the chassis 10^a and is vertically movable with respect to the chassis. The tread 13^a includes an elongate body part 29^a shaped to receive the shoe of the wearer. Suitable toe clamps 32^a are provided on the forward portion of the tread part 29^a and a heel 33^a projects upwardly from the rear portion of the part 29^a. The means for supporting the tread 13^a on the chassis 10^a comprises spaced pairs or sets of pivotally connected links 35^a. The adjacent ends of the links 35^a are connected by pivot pins 36^a. The upper ends of the upper links 35^a are pivotally connected with the tread 13^a by pins 38^a carried in lugs 37^a on the part 29^a. Pins 40^a pivotally connect the lower ends of the links 35^a with suitable lugs 39^a on the chassis part 14^a. Spaced links 41^a extend between and connect the sets of links 35^a for synchronous operation. The opposite ends of the links 41^a may be connected with the links 35^a by the pivot pins 36^a.

Means is provided to guide the tread 13^a for vertical movement relative to the chassis 10^a. This means includes a cylinder 70 secured to and depending from the chassis part 14^a. A plug 71 is arranged in the lower end of the cylinder 70 and has a port 72^a for the free passage of air to and from the cylinder. A guide plunger 72 is secured to the part 29^a of the tread 13^a and extends downwardly from the said part. The plunger 72 slidably passes through an opening 73 in the part 14^a and is slidably received in the cylinder 70. The cooperation of the plunger 72 with the opening 73 and the cylinder 70 effectively guides the tread 13^a for vertical movement. The plunger 72 is provided with a flange 74 that is adapted to engage the plug 71 to limit the down-

ward movement of the tread 13a with respect to the chassis 10a. A shoulder 75 is provided on the interior of the cylinder 70 and is engageable by the flange 74 to limit the upward movement of the tread 13a relative to the chassis 10a. The plunger 72 is tubular and a spring 76 is arranged in the plunger and the cylinder 70 to be held under compression between the plug 71 and the part 29a. The spring 76 may serve to return or may assist gravity in returning the tread 13a and the chassis 10 to their normal relative positions.

The means B is operable by downward movement of the tread 13a relative to the chassis 10a to rotate the rollers or wheels 12a and thus propel the skate. The means B includes a housing 77 secured to or forming a part of the bracket 17a. The housing 77 has a tubular portion 77a secured to the part 14a and registering with a vertical opening 78 in said part. A nut 79 is rotatable within the opening 78 and the housing part 77a. A shaft 80 is fixed to the part 29a of the tread 13a and extends downwardly into the nut 79. The shaft 80 is shiftably and rotatably received in the nut 79. A helical groove 81 is provided in the shaft 80 and a lug or thread 82 is provided on the interior of the nut 79 to cooperate with the groove. The nut 79 is free to rotate but is held against vertical movement so that the thread 82 cooperating with the groove 81 causes rotation of the nut when the shaft 80 is moved vertically.

A drive is provided between the nut 79 and the axle 25a of the traction wheels 12a. This drive includes a helical gear 83 fixed to or forming a part of the nut 79. The housing 77 is shaped to accommodate or receive the gear 83. The under side of the gear 83 bears on a wall portion of the housing 77 to prevent downward movement of the gear and the nut 79. The upper side of the gear 83 cooperates with a washer 84 engaged against a wall portion of the housing 77 to prevent upward movement of the gear and the nut 79. A helical pinion 85 is freely rotatable on the axle 25a and meshes with the gear 83. The housing 77 is shaped so accommodate the pinion 85. A ratchet connection or ratchet drive is provided between the pinion 85 and the shaft 25a. Internal ratchet teeth 86 are provided on the pinion 85. The teeth 86 have abrupt ends facing in the direction of forward rotation of the axle 25a, assuming that the skate is moving forwardly. The rear sides of the ratchet teeth 86 are pitched or gradually inclined. A ratchet pawl or dog 87 is shiftable in a transverse opening 88 in the axle 25a to cooperate with the ratchet teeth 86. When the pinion 85 is driven by the gear 83 during downward movement of the tread 13a the flat forward face of a tooth 86 cooperates with the dog 87 to transmit rotation from the pinion 85 to the axle 25a, thus rotating the traction wheels 12a and propelling the skate. When the skate is coasting or when the traction wheels 12a are rotated through their engagement with the ground or floor the axle 25a rotates relative to the pinion 85 so that the projecting end of the dog 87 comes into engagement with the inclined rear sides of the teeth 86 and the dog 87 is alternately shifted back and forth by this engagement to ratchet past the teeth. The same operation takes place when the tread 13a moves upwardly relative to the chassis 10a.

The form of skate of the invention illustrated in Figs. 6, 7 and 8 of the drawings has substantially the same mode of operation as the previously described form of the invention. A person wearing the skates may propel himself by merely "treading" or alternately applying his weight on the right and left skates so that the above described means B of the skates drive their respective traction wheels 12a. The skates, of course, may be used in the same manner as the conventional roller skates.

Having described only typical preferred forms and applications of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art or fall within the scope of the following claims.

Having described my invention, I claim:

1. A skate comprising a chassis, pairs of rollers supporting the chassis for movement, a tread, means supporting the tread on the chassis for vertical movement with respect thereto, means operable by downward movement of the tread relative to the chassis for rotating at least one pair of rollers to propel the skate including a nut movable vertically with the tread, and a screw shaft having a driving connection with the said driven rollers to drive the same, and a spring surrounding the shaft and cooperating with the chassis and tread to urge the tread upwardly.

2. A skate comprising, two sections related for relative vertical movement, one a chassis section, the other a tread section, pairs of rollers carried by the chassis section and supporting the same for movement, and means operable by relative vertical movement between the sections for rotating a pair of rollers to propel the skate, said means including two relatively rotatable parts one carried by one of said sections, the other carried by the other of said sections, one part being a shaft having a helical groove, the other part being a nut having a thread cooperating with said groove, a drive between the rotatable part and a pair of rollers whereby said pair of rollers is rotated by downward movement of the tread section, and ratchet means associated with one of said parts whereby upward movement of the tread section does not cause rotation of said pair of rollers.

3. A skate comprising, two sections related for relative vertical movement, one a chassis section, the other a tread section, pairs of rolers carried by the chassis section and supporting the same for movement, and a screw and nut means operable by downward movement of the tread sections relative to the chassis section to rotate a pair of rollers to propel the skate, said means including a part carried by each section, one of said parts being rotatable, the other being non-rotatable, a helical groove in one part, a thread on the other part cooperating with the groove to produce rotation of the said rotatable part, a drive between said rotatable part and a pair of rollers, and ratchet means associated with one of said parts whereby upward movement of the tread section does not cause rotation of said pair of rollers.

4. A skate comprising a chassis, pairs of rollers supporting the chassis for movement, a tread, means supporting the tread on the chassis for vertical movement with respect thereto, and a screw and nut means operable by downward movement of the tread relative to the chassis for rotating a pair of rollers to propel the skate, said means including a ratchet mechanism whereby upward movement of the tread does not drive said pair of rollers.

5. A skate comprising a lower section, rollers on the lower section, an upper section, means supporting the upper section on the lower section for vertical movement with respect thereto, means guiding the upper section for such vertical movement, means limiting relative vertical movement between the sections, an upwardly projecting hollow heel on the upper section, and means operated by the upper section during downward movement of the same to rotate certain of the rollers to propel the skate, the last mentioned means including a nut in the heel movable vertically with the upper section, and a screw shaft having a driving connection with said certain rollers and cooperating with the nut to be rotated thereby.

6. A skate comprising a lower section, rollers on the lower section, an upper section, means supporting the upper section on the lower section for vertical movement with respect thereto, means guiding the upper section for such vertical movement, and screw and nut means operated by the upper section during downward movement of the same to rotate certain of the rollers to propel the skate, the last mentioned means including a ratchet mechanism for effecting its disengagement during upward movement of the upper section.

7. A skate comprising a lower section, rollers on the lower section, an upper section, means supporting the upper section on the lower section for vertical movement with respect thereto, and means operated by downward movement of the upper section for rotating certain of the rollers including a rotatable shaft carried by the lower section, a nut carried by the upper section and cooperating with the shaft to rotate the same during downward movement of the upper section, a drive between the shaft and said certain rollers, and a ratchet means whereby said certain rollers are rotated by the shaft during downward movement of the upper section and are free during the upward movement of the upper section.

8. A skate comprising a lower section, rollers on the lower section, an upper section, means supporting the upper section on the lower section for vertical movement with respect thereto, and means operated by downward movement of the upper section for rotating certain of the rollers including a rotatable shaft carried by the lower section and having a helical groove, a nut rotatably carried by the upper section and cooperable with the groove, ratchet means holding the nut against rotation during downward movement of the upper section whereby the nut causes rotation of the shaft and permitting rotation of the nut during upward movement of the upper section and when the upper section is in its lowermost position, and a drive between the shaft and said certain rollers.

9. A skate comprising a lower section, rollers on the lower section, an upper section, means supporting the upper section on the lower section for vertical movement with respect thereto, and means operable by downward movement of the upper section for rotating certain of the rollers including, a shaft movable with the upper section, a nut rotatably carried by the lower section and cooperating with the shaft to be rotated thereby during its vertical movement, and a drive between the nut and said certain rollers.

10. A skate comprising a lower section, rollers on the lower section, an upper section, means supporting the upper section on the lower section for vertical movement with respect thereto, and means operable by downward movement of the upper section for rotating certain of the rollers including, a shaft movable with the upper section, a nut rotatably carried by the lower section and cooperating with the shaft to be rotated thereby during its vertical movement, and a ratchet drive between the nut and said certain rollers.

11. A skate comprising a lower section, rollers on the lower section, an upper section, means supporting the upper section on the lower section for vertical movement with respect thereto, and means operable by downward movement of the upper section for rotating certain of the rollers including, a shaft movable with the upper section, a nut rotatably carried by the lower section and cooperating with the shaft to be rotated thereby during its vertical movement, and a gear drive between the nut and said certain rollers, the drive including a ratchet means.

12. A skate comprising a lower section, rollers on the lower section, an upper section spaced above the lower section and in substantially parallel relation thereto, means supporting the upper section on the lower section for vertical movement with respect thereto, means guiding the upper section for such vertical movement, and means operated by the upper section during downward movement of the same to rotate certain of the rollers to propel the skate, the last named means comprising a nut carried at the upper side of the upper section to move vertically therewith, a substantially vertical screw shaft rotatably carried by the lower section and extending upwardly through the nut to be rotated thereby, a drive between the shaft and said certain rollers, and a ratchet mechanism associated with the nut and shaft whereby the said certain rollers are rotated by the shaft during downward movement of the upper section and are free during upward movement of the upper section.

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