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SAFETY ROLLER SKATE

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2 Sheets-Sheet 2

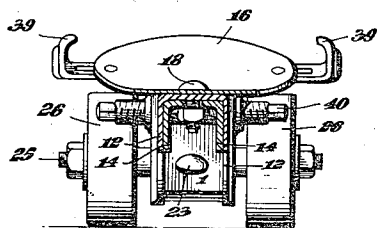


Fig. 4

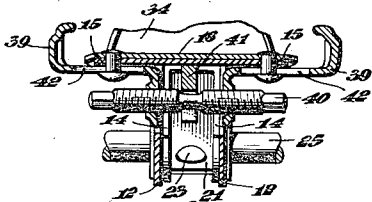


Fig. 6

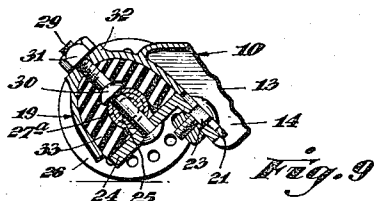


Fig. 9

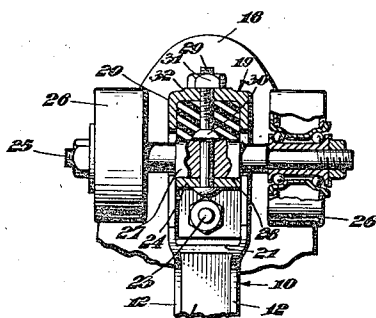


Fig. 5

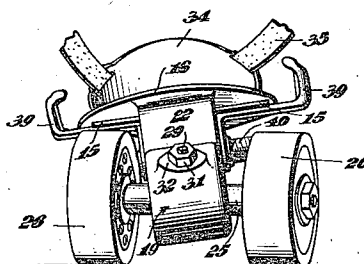


Fig. 8

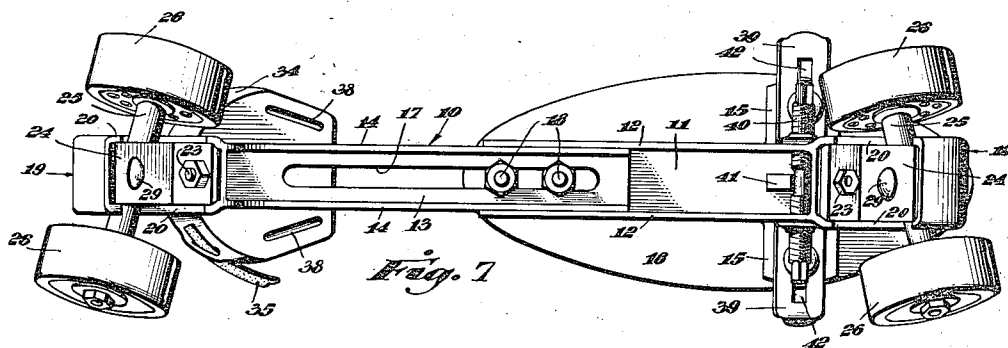


Fig. 7

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SAFETY ROLLER SKATE

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13 Claims. (Cl. 208—173)

This invention relates to roller skates, more particularly to improved low hung, long wheel-base, self-steering, safety roller skates which require but little skill for their use and enjoyment, and which are suited for outdoor, rink or theatrical skating.

The recent revival of roller skating as a sport for children and adults has been hampered in its growth of popularity by reason of the inadequacy of the skates heretofore available for safe use by inexperienced skaters. These old type skates can be used only by adept roller skaters, whose skill has been acquired by long practice. The design of these skates is such that the wheels thereof are placed close to or nearly directly under the load center on the skate frame, which design presumably has been intended to facilitate easy direction control. This construction provides poor load distribution with respect to the stability and balance of the skater upon the skate unless the proper "feel" is previously acquired by the skater. The culmination of the design tendency in respect to this type of skate is exhibited by the devices used by theatrical skating performers, wherein the wheel base of the skate is shortened as much as possible to provide a very short steering radius. These special theatrical skates obviously represent the antithesis of a safety skate suitable for use by one who is not thoroughly familiar and competent at the art of skating.

This invention is based on the perception that the high hung roller skates heretofore known are not adapted to be used by inexperienced persons because of their inherent instability when in use.

It is an object of this invention to provide an improved low hung or "underslung" roller skate in which the roller wheels are mounted on axles supported within yokes extending forwardly and rearwardly of the skate frame, with the said axles being mounted for yielding movement in compound directions, to permit controlled steering of the skate by the foot of the skater tilting incident to curve executions.

Another object of this invention is to provide a low hung roller skate having a long wheel-base in which the user's weight is loaded on the skate frame over an appreciable area longitudinally intermediate of the wheels, the length of the loading area being appreciably less than the length of the wheel-base.

It is another object of my invention to provide a long wheel base roller skate of stabilized rideability whereon one is able to positively and

directly control one's direction of movement even in intricate figure skating by rocking of one's foot or feet.

A still further object of the invention is to provide an improved axle mounting permitting yielding or flexible movement in compound directions, in which the sensitivity of steering movement is adjustable.

In the drawings which disclose one embodiment of the invention:

Figure 1 is a side elevation of a skate made according to the invention.

Figure 2 is a plan view of the skate, the in-step support strap of the skate being removed for the purpose of illustration.

Figure 3 is a longitudinal sectional view taken on line 3—3 of Figure 2.

Figure 4 is a transverse sectional view taken on the line 4—4 of Figure 1, showing the nesting of the frame channels.

Figure 5 is a cross sectional view through the steering yoke taken on line 5—5 of Figure 1.

Figure 6 is a cross sectional view taken on the line 6—6 of Figure 1, showing the construction of the toe clamps with respect to the frame and sole plate.

Figure 7 is a plan view of the underside of the skate, showing the wheels in steering position for a right hand turn.

Figure 8 is a front elevation, the front wheels being shown in right hand turning position.

Figure 9 is a fragmentary cross sectional view, showing a modification of the axle pivot journal.

Briefly, the skate of this invention comprises a longitudinal frame, preferably of channel iron construction having sides formed to present a streamline appearance, yokes or axle mountings disposed at the front and rear extremities of said frame to project therefrom and carry said frame in low hung or underslung relation with the upper face of the frame relatively close to the skating surface for stability, axles carried by said axle mounting housings in yieldable pivoted engagement therewith for compound movement complementary and proportional to the tilting of the frame to one side or to the other during the execution of curves, and wheels rotatively carried by said axles externally of the frame.

Referring to the drawings which disclose one skate of a pair, a longitudinal frame, extensible as to length to accommodate varying foot sizes, is generally indicated at 10. This frame comprises a front frame portion 11 in the form of a channel having depending formed sides 12, 12,

the top of which is curved upwardly toward the front extremity thereof, and a rear frame portion 13 of similar channel form having downwardly depending sides 14, 14, of suitable width for telescopic adjustment within the front frame channel 11. The rear frame portion 13 is substantially straight in longitudinal cross section, and the forward extremity thereof lies in nested telescopic engagement with the rearward portion 10 of the front frame channel 11, the sides 14, 14, lying within and adjacent the sides 12, 12, respectively.

Medially of the length of the front channel, outwardly projecting sole plate supports 15, 15, are provided, one for each side. These projections are preferably made by partially blanking the same, except at the upward edge, from the side channels 12, 12, respectively, and subsequently upwardly bending the same whereby the projections are caused to lie in the general curvilinear plane of the upper web of the front channel 11. This construction affords a toe clamp mechanism aperture through the channel sides 12, 12, and furthermore provides a rigidified sole plate mounting.

A sole plate 16 generally configured in the form of a shoe sole and shaped to conform generally to the upward longitudinal curve of the front channel 11, is rigidly symmetrically mounted, preferably by spot welding or the like, to the upper web of the front channel 11 and to the support projections 15, 15.

The rear frame channel 13 is longitudinally slotted medially of its length as at 17, and is annexed to the front channel 11 by round headed carriage bolts 18, 18, having square shanks which pass through the sole plate 16 and ride in the said slot 17 so as to remain non-rotative as the nuts of the bolts lying within the channel are tightened.

A front wheel journal yoke or housing 19, preferably convergingly U-shaped in cross section is mounted in inverted and canted position to the front extremity of the front channel 11 and has flanges or sides 20, 20, recessed for wheel axle passage, and also has an inner limb 21 longer than the outer limb. The sides 12, 12, of the channel 11 are preferably bevelled to slope upwardly in forward direction and are flared to receive the yoke which is annexed thereto by welding or the like with the longitudinal axis of the yoke slanting upwardly and forwardly to form an acute angle with the longitudinal axis of the skate.

The yoke 19 is disposed to extend beyond the frame 10, and thereby permit the same to be low hung with the general outline of the depending sides 12, 12, of the front channel 11 formed to accentuate streamline appearance.

The inner transverse limb 21 of the U-shaped housing 19 is longitudinally slotted to adjustably carry a square shanked bolt 23 for mounting an angle type journal plate 24 thereto with the forward or exposed face of the bracket lying in a plane at an acute angle with the surface on which the wheels of the skate are to ride. This journal plate portion of the angle bracket 23 projects downwardly forwardly to the approximate level of the lower extremity of the front frame sides 12, 12.

An axle 25 counterturned at its extremities to rotatively carry ball bearing wheels 26, 26, one for each side, and having a shoulder 27 of enlarged diameter equal in length to the width of the plate 24, flatted as at 28, with substantially

flat upwardly converging sides adjacent thereto, is centrally disposed on the journal plate of the angle bracket 24 for pivoted rotation thereon with the flat 28 cooperating with the forward face of the journal plate to constitute a pivoting journal.

The axle 25 is pivotally annexed to the journal plate 24 and thus to the skate frame 10, by a pivot pin 29, which pin is rigidly mounted to the plate 24 in symmetrical and squared relation. The pin 29 passes through a central bore in the shoulder 27 of the axle 25 to carry an abutment element 30 in contact with the shoulder 27 opposite the flat 28, and likewise passes through the yoke or housing 19 and is threaded to carry a nut 31 in engagement with a boss 32 of the yoke. It is preferred that the pin 29 is disposed to extend forwardly and upwardly at an angle approximating 45° with respect to the plane of the skating surface.

The axle-journal plate construction described essentially constitutes a low hung fifth wheel disposed in angular relation for yielding axle movement compound in relation to tilting of the frame.

The recessing of the sides 20, 20, or the flanging of the yoke 19 symmetrically about the axle 25 affords an abutment means for positively limiting the axle 26 from assuming too great a steering angle or becoming dangerously canted during skating.

An elastic bushing or cushion 33, of rubber or the like, is disposed within the housing 19 between the sides 20, 20, and the converging front and rear limbs to firmly but tensively embrace the axle 25 and rest against the face of the journal plate angle bracket 24.

As the sole plate 16 is tilted, as in Figure 7, the bush 33 is squeezed against the inward face of the housing on one side and the outward face of the housing on the other side of the central shoulder of the axle. The flexing of the bush impedes steering action and tends to return the axle to its normal squared position with respect to the longitudinal axis of the skate.

As previously noted, the outer limb of the yoke or housing 19 and the inner limb 21 thereof are convergingly disposed in relation to one another with the bush or thrust cushion 33 in compressioned engagement with the said sides and with the relatively flat side surfaces of the shoulder 27. The degree of compression thereof within the housing 19 and against the faces of the shoulder 27 determines the degree of sensitivity of the steering movement of the axle as the sole plate is tilted or rocked to either side.

Therefore, to provide adjustability of the compressive force acting upon the bushing and thereby provide adjustment of sensitivity of steering action, the angle bracket 24 is longitudinally adjustably mounted to the inner face 21 of the housing 19 through the bolt 24 residing in a suitable slot. By reason of the wedging action of the cushion 33 within the converging limbs of the housing 19 against the relatively flat sides of the hub 27, tightening of the nut 31 causes appreciable increase of the compressive force on the cushion acting on the sides of the hub, thereby tending to minimize the movement of the hub with respect to tilting forces acting on the sole plate. Thus if the skates are to be used by a person of heavy weight the bolt 23 is unloosened and the nut 31 is screwed down to draw the pressure plate 24 against the bushing 33 and to increase the compression upon the same to the

desired extent, after which the bolt 23 securing the pressure plate to the inner face 21 of the housing 19 is tightened and the skate is ready for use. Contrariwise, if the skates are to be used by a person of light weight, the pressure acting on the rubber through the sole plate is correspondingly lessened to increase sensitivity of the steering mechanism.

Figure 9 discloses a modification of the axle mounting construction wherein the axle 25 is provided with a cylindrical shoulder 27 resting in line contact on the journal plate 24, the other structural elements being similar to those previously described. This construction is particularly adapted to small sized skates suited to use by light weight persons.

To multiply the steering effect obtained by the construction hereinbefore described, the rear wheel mounting comprises a mechanism similar in construction and numerated similarly to the front wheel mounting but oppositely disposed to project rearwardly from the skate frame. Since the rear frame channel is substantially straight in longitudinal cross section, the yoke 19 for the rear wheel mounting is annexed directly to flared sides 14, 14, of the rear channel 13, without the use of the filler plate 22 indicated at the front extremity of the skate.

By reason of opposite disposition of the rear wheel mounting with respect to the front wheel mounting, tilting of the skate sole plate to one side or the other causes the front and rear wheels to assume complementary angular steering positions with the result that the steering radius is doubly shortened, thus making the skate suitable to use for fancy skating wherein its characteristics and controllability are appreciably greater than the ordinary roller skate heretofore used.

The rear wheel 19 is mounted preferably with the upper extremity thereof in the same plane or above the plane of the top web of the rear channel 13 to afford a low hung mounting of the skate frame on the wheel axles. Thus both the front and rear wheel axles support the frame 10 intermediate thereof with the skate adapted to support one's foot close to the ground to provide high stability whether the user is moving or standing still.

To secure the skate to the shoe of the user's foot, a heel housing bracket comprising a curved guard 34 and a heel plate 36 is slotted to carry an instep strap 35 appreciably inwardly from the rear wheels 27 and rigidly mounted to the rear channel portion 13 of the frame 10. The heel plate 34 is corrugated to include a recessed portion 37 wherein the bolts 18, 18, can pass when the skate is in the extremely shortened position and is stiffened by the indentations 38.

Disposed within the apertures in the sides 12, 12, of the front channel portion, which apertures were made in the forming of the sole plate projections 15, 15, are mounted adjustable cooperating toe clamps 39, 39. These toe clamps comprise opposed L-shaped brackets having downwardly depending projections at their opposed inner portions and have, at their outward extremities, inwardly facing hook-like clamp projections which extend upwardly above the sole plate 16 for grasping engagement with the sole of the shoe of the skate user.

The downwardly depending opposed faces of the clamps 38, 38, are bored and threaded to receive oppositely threaded portions of a right and left-hand threaded clamp screw 40 having squared heads at its outer extremities and hav-

ing an undercut separating the oppositely threaded portions medial of its length for resting engagement with a slot of a downwardly depending clip 41 mounted to the underside of the front frame channel 11, whereby the screw is held against lateral displacement during the rotation thereof for clamping. The clamps 38, 38, are preferably slotted as at 42, to receive attachment rivets 42, 42, one for each clamp, passing therethrough and sustaining the clamp assembly to the sole 16 in slidable engagement with the underside face of the sole plate projections 15, 15.

The relative disposition of the heel housing and toe clamp upon the skate frame assists in the accomplishment of stability of the skate. The heel plate is located appreciably forward of the rear wheel mounting; likewise the toe clamp is mounted appreciably rearward of the front wheel mounting. The area between the toe and heel positioning elements constitutes substantially the area subject to weight loading. By the described location of these elements, this area is longitudinally within and pronouncedly less than the wheel base of the skate, whereby stability is afforded inhibitory of the skate tending to roll from under the user, as is frequently the case with old type skates.

Having described my invention, I claim:

1. A roller skate, comprising, front and rear wheel bearing axle mounting yokes, elastic linings respectively for the axle mounting yokes, a foot bearing frame low-hung therebetween with said front and rear yokes extending endwise from said frame, an axle carried by each yoke recessed in said elastic lining, and roller wheels rotatively carried by said axles.

2. A roller skate, comprising, front and rear wheel bearing axle mounting yokes, an extensible frame of cooperating channel irons in nested telescopic relation low-hung between said yokes with the yokes extending endwise from said frame, and an axle for each yoke having wheels rotatively journaled at the outer extremities thereof, said axles being pivotally engaged with said yoke for angular steering movement compound with respect to tilting of the skate frame.

3. A roller skate, comprising, front and rear U-shaped wheel bearing axle mounting yokes, a foot sustaining frame low-hung therebetween, an axle for each yoke pivotally annexed thereto for angular movement compound with respect to tilting of the skate frame, wheels rotatively carried externally of said frame, and means carried by said yokes for impeding compound movement of said axles, comprising elastic bushes to carry said axles in socketed relation in said yokes.

4. A roller skate, comprising, a foot-bearing frame, front and rear axle sustaining yokes carried by said frame for a low-hung suspension of the frame, said yokes comprising fifth wheel plates and housings therefor, axles carrying roller wheels at their outer extremities externally of said frame pivoted on said fifth wheel plates for angular movement compound with respect to tilting of the skate frame, and elastic bushes interposed in said yoke housings to compressingly embrace said axles and return said axles to squared relation to said skate frame upon movement thereof.

5. A roller skate, comprising, a rigidified foot sustaining frame, carrying means for fastening the same to a shoe intermediate the frame extremities, pivots endwisely extending angularly upwardly from the forward and rearward ex-

5 tremities of said frame, centrally diametrically
bored axles sustained on said forward and rear-
ward pivots for steering movement compound in
relation to tilting of the skate frame, and roller
wheels rotatively carried at the outer extremities
of said axles.

6. A roller skate, comprising, a foot bearing
frame carrying means for fastening the same to
a shoe intermediate the frame extremities, piv-
ots endwisely extending angularly upwardly
from the forward and rearward extremities of
said frame, centrally diametrically bored axles
sustained on said forward and rearward pivots
for steering movement in compound direction
when the skate frame is tilted, roller wheels ro-
tatively carried at the outer extremities of said
axles, yoke housings enclosing said pivots and
axle portions adjacent thereto, elastic bushes in-
terposed within said housing in compressioned
embracement against said axles for impeding
pivotal movement of said axles, and means for
moving said housings toward and from said
axle to vary the compressive force of said inter-
posed elastic bushes against said axles.

7. A roller skate, comprising, forwardly and
rearwardly facing journal plates each respective-
ly disposed with the upper surfaces thereof an-
gularly facing outwardly upwardly, a foot bear-
ing frame carrying means for fastening the
same to the sole of a shoe intermediate the
frame low-hung between said journal plates,
with said journal plates extending endwisely
from the extremities of said frame, pivot pins
centrally disposed to extend upwardly from said
faces of said journal plates with the longitudi-
nal axes thereof lying at an acute angle of ap-
proximately 45° with respect to the longitudinal
axis of the skate frame, centrally diametrically
bored axles rotatively carrying wheels at the
outer extremities thereof disposed on said pivot
pins, and flexible means embracing said axles at
the areas thereof adjacent said pivot pins for
impeding pivotal rotation of said axles.

8. A roller skate including a foot bearing
frame and wheel bearing axle mounting yokes
at the forward and rearward extremities thereof,
one of said yokes comprising a cup-shaped hous-
ing disposed on said frame in angularly in-
wardly inverted position, a pivot pin movably de-
pending centrally within said housing, a journal
plate rigidly secured to said pivot pin to provide
a fifth wheel for said axle, a centrally diametrical-
ly bored axle rotatively carrying roller wheels at
the outer extremities thereof journaled with its
bore embracing said pivot pin, a yielding bush in-
terposed within said housing and against said
journal plate to embrace the axle, and means for
increasing and decreasing compression of said
yielding means against said axle to impede pivotal
movement thereof.

9. In a roller skate, a wheel assembly mount-
ing therefor, comprising, a yoke having con-
verging limbs and flanged sides to constitute a
cupped housing, a journal plate across the open
face thereof, an axle in pivotal engagement
with the inner face of said journal plate, said
axle extending beyond said flanges of said yoke
in sidewise direction with the flanges limiting
the extent of axle movement, an elastic bush
interposed between said axle and said cup-
shaped housing, and means for moving the jour-
nal plate carrying the axle toward and from
the bush, whereby the compression of the bush
against the axle can be varied.

10. In a roller skate including a foot bearing
frame, an axle and roller wheels journaled at
the outer extremities thereof and an axle
mounting yoke for permitting yielding steering
movement of said axle compound in direction
with respect to tilting of said skate frame, said
axle mounting yoke comprising a U-shaped
housing having converging limbs, a journal plate
attached to one of said limbs to extend across
the open extremity of said U-shaped housing, an
axle having a central flattened shoulder, said
axle being pivoted with the flattened shoulder
thereof in engagement with the inner face of
said journal plate, said axle also having sub-
stantially flattened sides adjacent said flattened
surface, an elastic bush disposed within said
housing to embrace said flattened sides of said
axle, and means for wedging said elastic bush
convergently toward the limbs of said housing
to provide means for increasing the compression
of said bush against the sides of said axle.

11. In a roller skate, an extensible foot bear-
ing frame including a sole plate and toe clamp-
ing means, said frame carrying axle bearing
wheel mounting yokes at the forward and rear-
ward extremities thereof in low-hung relation,
said frame comprising channel irons in nested,
telescopic relation, one of said irons, constitut-
ing the front portion of said frame having de-
pending sides partially blanked inwardly from
the forward extremity of said skate to provide
a toe clamp aperture with the partial blank
thereof bent upwardly to lie in the plane of the
web of the channel and project outwardly there-
from to provide sole plate support means.

12. A roller skate including a foot bearing
frame and a wheel bearing axle mounting fifth
wheel yoke extending endwisely therefrom, said
yoke comprising a U-shaped housing having
converging limbs and flanged sides, a journal
plate movably attached to one of said limbs
for movement toward and from said U-shaped
housing and extending across the open ex-
tremity thereof, a pivot pin mounted on said
journal plate to extend therefrom to and
through the closed extremity of said housing
to carry an adjusting nut therebeyond, a cen-
trally diametrically bored axle rotatably car-
rying wheels at its outer extremities, disposed
on said pivot pin for fifth wheel engagement
with said journal plate, a shoulder on said pivot
pin for sustaining the position of said axle
thereon against said journal plate, and an
elastic bush interposed within said housing to
embrace said axle, tending to compressingly
urge said axle to normally squared position in
relation to said skate frame, said journal plate
adjustment means being provided to wedge said
elastic bush toward and from said converging
limbs to increase and decrease flexibility of said
bush.

13. A roller skate, comprising front and rear
U-shaped wheel bearing axle mounting yokes, a
foot sustaining frame low-hung therebetween, an
axle for each yoke pivotally annexed thereto for
angular movement compound with respect to
tilting of the skate frame, wheels rotatively
carried externally of said frame, means carried
by said yokes for impeding compound movement
of said axles comprising elastic bushes to carry
said axles in socketed relation in said yokes, and
means for varying the flexibility of said elastic
bushes.

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