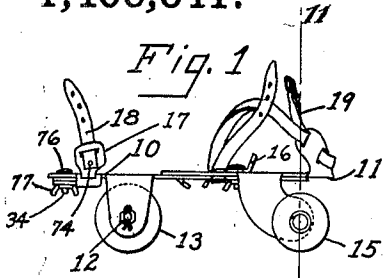
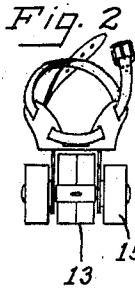
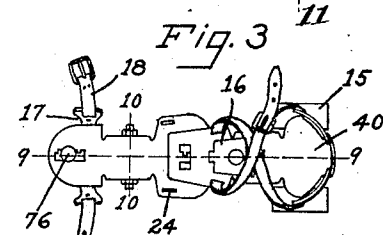
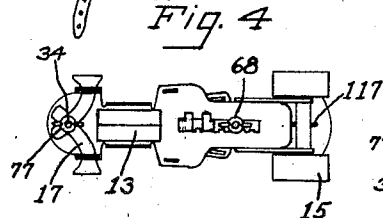
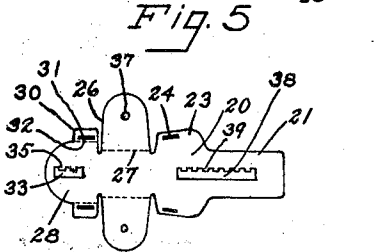
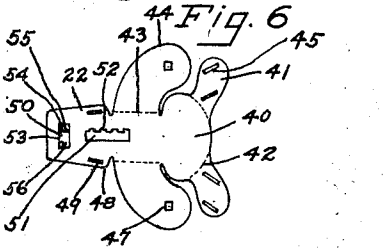
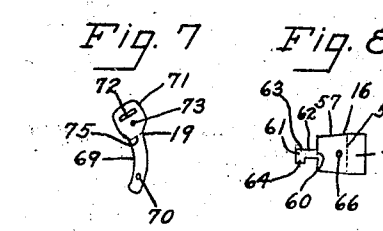
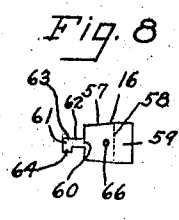
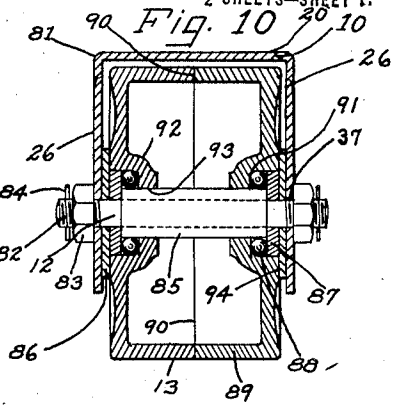
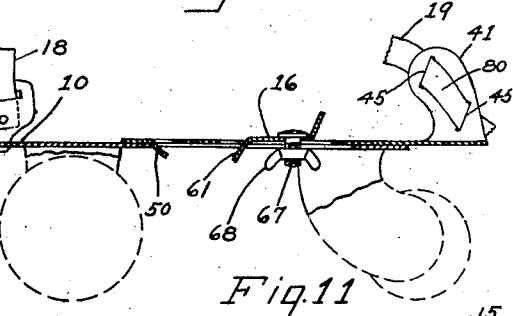
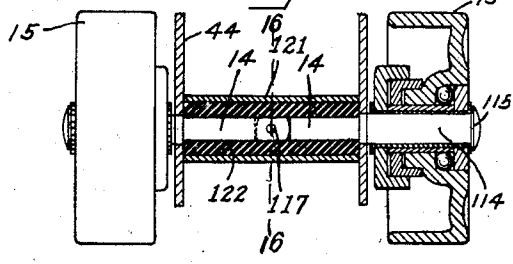
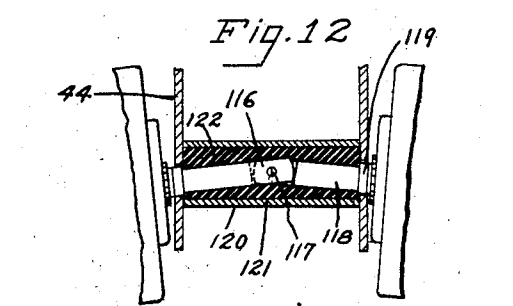


1,406,641.

Patented Feb. 14, 1922.

2 SHEETS—SHEET 1.



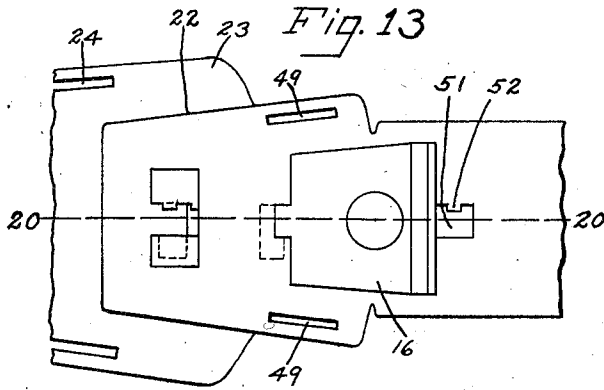
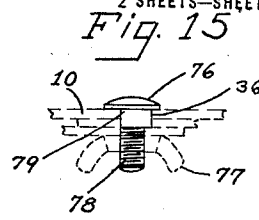
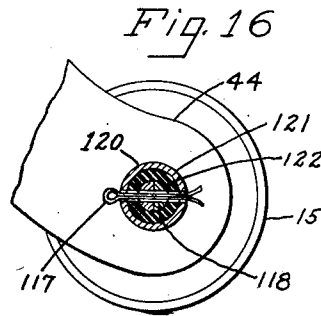
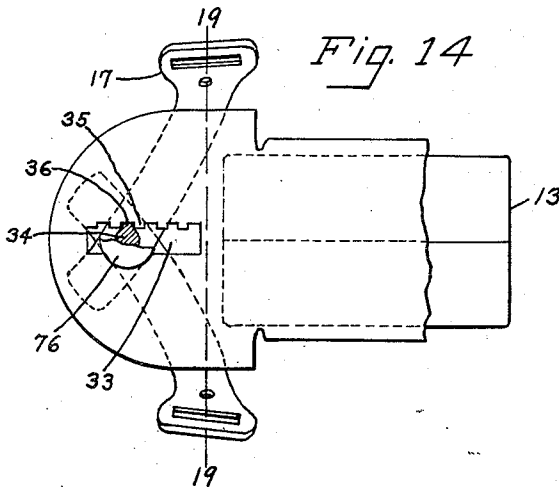
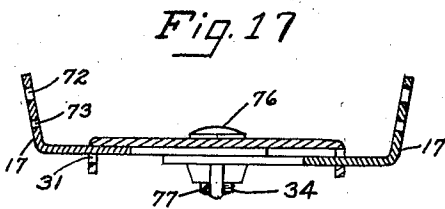
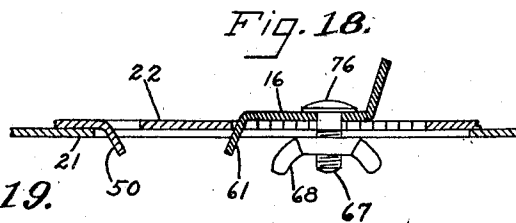
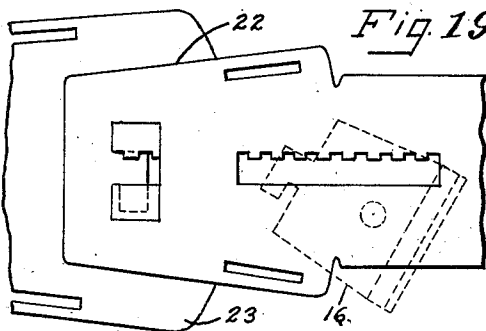
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Atty.

E. E. HARDY.
 ROLLER SKATE.
 APPLICATION FILED JAN. 15, 1920.

1,406,641.

Patented Feb. 14, 1922.

2 SHEETS—SHEET 2.



Inventor
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UNITED STATES PATENT OFFICE.

EMERY EASTMAN HARDY, OF BROOKLYN, NEW YORK.

ROLLER SKATE.

1,406,641.

Specification of Letters Patent. Patented Feb. 14, 1922.

Application filed January 15, 1920. Serial No. 351,579.

To all whom it may concern:

Be it known that I, EMERY EASTMAN HARDY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Roller Skates, of which the following is a specification.

My invention relates to improvements in roller skates, having relation to the form shown and described in certain patents already issued to me, to wit:—Nos. 1,152,813, 1,228,111, and 1,276,212, and also in applications filed by me, to wit:—Serial Nos. 351,580, 402,368, and 402,367, and the object of my improvement is simplicity and economy in construction and convenience and efficiency in use.

In the accompanying drawing:—

Figure 1 is a side elevation of my improved roller skate.

Figure 2 is an end elevation of the same.

Figure 3 is a plan view of the same.

Figure 4 is a bottom view of the same.

Figure 5 is a plan view of the blank for the front frame member.

Figure 6 is a plan view of the blank for the rear frame member.

Figure 7 is a plan view of the blank for one of the toe clamping members.

Figure 8 is a plan view of the blank for the heel stop member.

Figure 9 is a sectional view on an enlarged scale on the line 9—9 of Fig. 3.

Figure 10 is a sectional view on the line 10—10 of Fig. 3.

Figure 11 is a sectional view on the line 11—11 of Fig. 1.

Figure 12 is a similar view, with certain parts omitted, showing the two shaft members tilted from the normal position of alignment.

Figure 13 is a fragmentary plan view showing the heel stop member and adjacent parts.

Figure 14 is a fragmentary plan view showing the toe clamping members and adjacent parts and with the head of the clamping bolt in part broken away.

Figure 15 is a side elevation of the toe clamping bolt.

Figure 16 is a sectional view on the line 16—16 of Fig. 11.

Figure 17 is a sectional view on the line 19—19 of Fig. 14.

Figure 18 is a sectional view on the line 20—20 of Fig. 13.

Figure 19 is a fragmentary plan view showing part of the front frame member and part of the rear frame member superimposed thereon, previous to placing the stop member in position.

My improved roller skate comprises a frame that is made of sheet metal and is composed of a front frame member 10 and a rear frame member 11 that are separably and adjustably connected together; a shaft 12 connected to the front frame member 10 having mounted on the middle portion a front wheel structure 13; a shaft structure 14 in alignment connected to the rear frame member 11 that supports by its ends the rear wheels 15; a heel stop member 16 at the front end of the heel space on the rear frame member 11; and metal toe clamping members 17 operatively connected to the front frame member 10; and also, as regards the straps, has a novel arrangement for the toe straps 18 and also for the heel straps 19.

Considering the blank for the front frame member 10, this comprises the longitudinally extended body portion 20 the rear part 21 of which is adapted to receive the front part 22 of the rear frame member 11, has side extensions 23 that are provided each with a slot 24 for the front toe strap or for an extra strap adjacent the middle portion, has in front of the said side extensions a laterally directed wing 26 on each side, connected along the folding line 27, that serve as the side supporting or connecting arms for the front wheel structure, and which at the front end portion 28 operatively supports the front or toe clamping members 17.

On each side of the front end portion 28 is a wing 30 that has a slot 31 for the said toe clamping member 17 and is connected to the said front end portion 28 along the folding line 32, and the said front end portion 28 is provided along the middle with a longitudinal slot 33 for the clamping screw 34 for the toe clamping members 17 and which has on one side, as shown, on the right side, a set of teeth 35 for a lateral projection 36 on the said clamping screw 34.

The wings 26 have each a hole 37 for the shaft 12.

The rear portion 21 that is overlapped by

the front portion 22 is provided with a longitudinal slot 38 that is provided on the right side with a set of teeth 39.

In shaping the blank for forming the front frame member in complete condition for use the wings 26 that receive the shaft 12 and the wings 30 that receive the toe clamping members 17 are bent downwardly relatively to the body portion 20.

Considering the rear frame member 11, the blank therefor comprises the front end portion 22 already mentioned, the heel portion 40 at the rear, rear heel lugs 41 connected along the folding line 42 to the heel portion 40, one on each side, and extending laterally on each side, adjacent the junction of the front portion 22 and the heel portion 40, and connected along the folding line 43, is the wing 44 that serves as one of the connecting arms for the rear shaft members 14.

The rear heel lug 41 has in each case a pair of slots 45 for the rear heel strap 19, being appreciably separated. The wings 44 have each a hole 47 for the shaft part 14, and which, as shown, is square.

In front of each of the side wings 44 is a laterally directed extension 48 having a slot 49 for the heel strap 19.

The front overlapping portion 22 comprises along the middle longitudinal line or axis a lug 50 adjacent the front end and immediately in the rear thereof a longitudinal slot 51 that has a set of teeth 52 along the edge on the right side.

The lug 50 is integral with the material of the adjacent body portion, being connected by the front end along the line 53, and comprises a short neck 54 extending rearwardly from the said line 53, has a straight, longitudinally directed edge 55 along the right edge, and on the rear end has a laterally directed wing 56 on the left side.

In shaping the rear frame member 11 from the blank the lug 50 is depressed appreciably by bending along the line 53, a bend of less than a right angle, as shown, being sufficient, and right angle bends are provided for the wheel wings or arms 44 and the rear, fixed heel lugs 41, the latter being bent upwardly and the former downwardly.

The heel stop member 16 is formed of sheet metal and comprises in the blank the body portion 57 that is connected at the rear end along the folding line 58 with the wing 59 that serves as the front heel lug when bent upwardly and that is connected at the front end along the line 60 with the assembling or holding lug 61 that is the counterpart of the lug 50 and differs therefrom in being directed towards the front from its supporting end instead of towards the rear. Thus the said lug 61 comprises the short connecting neck 62, has the straight, longitudinally directed edge 63 on the right side, and on the

left side has the wing or tooth 64 that overhangs the neck 62 on the left side.

The body portion 57 is provided along the axis with a hole 66 for the heel clamping screw 67.

In shaping the blank for the heel stop member 16 the heel lug wing 59 is bent upwardly relatively to the body portion 57 along the line 58, preferably, as shown, at slightly less than a right angle, and the assembling or holding lug 61 is depressed appreciably, being bent generally adjacent the line 60, generally after the manner of bending the material for positioning the lug 50, as described.

In use the rear frame member 11 overlays front frame member 10, the latter being on the under side, and the heel stop member 16 overlays the overlapping portions of the two frame members, and the parts are constructed and arranged so that the lug 50 extends downwardly through the slot 38, the neck 54 being positioned in the said slot and the wing lug or tooth 56 being engaged with the under side of the front frame member 10, and the lug 61 extends through the two slots 51 and 38, the neck 62 being positioned in the said slots and the wing lug or tooth 64 being also engaged with the under side of the front frame member 10.

The straight edge portions 55 and 63 of the lugs 50 and 61 enter within the spaces between the opposed teeth that are arranged in rack-like form on the right side of each of the slots mentioned, comprising the teeth 39 for engaging with the lug 50, at the front end portion of the slot 38, and the teeth 39, at the rear portion of the slot 38, for engaging with the lug 61, on the under side of the superimposed parts, and the teeth 52 on the rear member 11 that also engage with the lug 61.

Thus the neck 54 extends through one thickness of material and the neck 62 extends through two thicknesses of material.

The heel clamping bolt 67 extends through the material of the front frame member 10 and the rear frame member 11, being positioned in the slots 51 and 38, and also through the body portion 57 of the heel stop member 16, being positioned in the hole 66 provided therefor, as mentioned, and, as shown, is entered in position from the upper side, with the head engaged with the heel stop member 16, and is provided on the under side with a wing nut 68.

The two toe clamping members 17 are similar, except that one is right handed and the other left handed, and comprise each in the blank, as shown in Fig. 7, an extended body portion 69 of curved form for positioning the front and inner end portion appreciably forwardly, relatively to the rear portion, has a hole 70 in the said front and

inner end portion for the toe clamping bolt 34, and has at the side and outer end portion a wing lug 71 that is connected along the folding line 75 and has a slot 72 through which is threaded the toe strap 18 and a hole 73 for the rivet 74, as shown in Fig. 1, for securing the said strap.

The toe clamping members are formed from the blank by bending at a right angle along the line 75, and they are assembled in the operating position by having the body portion 69 slipped through the slot 31 in the wing 30 on the front frame member 10 so that the holes 70 are in registration one with the other and also in registration with the slot 33, the bolt 34 being finally slipped into place through the slot 33 and the holes 70, the two body portions 69 overlapping one another.

The toe clamping bolt 34 is entered from the upper side, the head 76 bearing on the front frame member 10, and a wing clamping nut 77 being provided at the lower end.

By shifting the toe clamping bolt 34 back and forth along the slot 33 the body portions 69 are projected more or less through the slots 31 and thereby the effective spread of the side strap supporting wings 71 is changed to correspond to different conditions of adjustment as may be desired and tightening the wing nut 77 serves to hold the parts in the position to which they have been adjusted.

In order to provide positive locking means for cooperating with the holding means described the toe clamping bolt 34 is provided with the laterally projecting tooth 36, already referred to, for cooperating with the teeth 35, arranged in rack-like form along one edge of the slot 33.

Thus the toe clamping bolt 34, as shown in Fig. 15, comprises the head 76 at the upper end, the threaded lower end 78, and intermediate the said ends, and particularly adjacent the said head 76, comprises a short shank or connecting portion 79 that deviates from the cylindrical form in the detail of having the tooth 36 project laterally on one side, the said tooth being generally V-shaped or of any form that is suitable for entering in the spaces between the teeth 35.

As an important detail, it will be noted that the length of the shank 79 that carries the tooth 36 is about the same as or slightly less than the thickness of the material of the front frame member 10, or particularly the part thereof that has the slot 33, so that the tooth 36 will not bear against the toe clamping members 16, and also, a change in adjustment can be made by releasing the wing nut 77 and unscrewing the same sufficiently to free the tooth 36 from the front frame member 10, and without removing the wing nut. That is to say, by unscrewing the wing nut to correspond approxi-

mately to the thickness of the material of the front frame member the toe clamping bolt can be lifted a sufficient amount to free the tooth 36, and thus to permit of a change in adjustment of the parts.

The heel clamping bolt 67 may be a plain bolt or of the locking form such as the bolt 34 described, for cooperating with the teeth that are provided along one edge of the slots in the frame members through which the bolt passes, as has been described. The tooth 36, where thus provided, serves to interlock the two frame members and the heel stop member against relative longitudinal movement.

Generally, however, the lugs 50 and 61 serve in a satisfactory manner as positive locking means for preventing such relative longitudinal movement of the particular parts that are in cooperation therewith.

In order to assemble the parts so as to bring the lugs 50 and 61 in operating position the lug must in each case be brought to a position at substantially right angles to the final position for entering the lug into the particular slot and is finally turned to the proper position for use.

Thus the two frame members are first assembled by bringing together the overlapping parts 21 and 22 at right angles one to the other, entering the lug 50 in the slot 38, and then turning the parts into position of alignment. Then the heel stop member 16 is assembled in substantially a similar manner. In Fig. 19 the parts are shown in partially assembled condition, the two frame members being in their final positions, ready to receive the heel stop member 16.

Provision is made for using as the strap element at the heel end a single relatively long strap 19, crossed over the foot, threaded through the side slots 24 at about the instep portion of the foot and at the rear threaded through the slots 45 in the rear fixed heel lugs 41, a shorter strap being usable in case the threading through the relatively front holes 24 is omitted.

The threading of the strap 19 through the heel lugs 41, involving the use of the slots 45, is special, as will be described.

Referring to Fig. 9, which shows the inner face of the right hand heel lug 41, and also to Figs. 1 and 2, it will be noted that the two strap slots 45 in each heel lug 41 are appreciably separated and they are positioned so as to provide a generally upward and frontward inclination to the part of the strap that is supported by the lugs 41 and the threading of the strap 19 is effected so that the part 80 of the strap 19 that extends from the upper and forward slot 45 to the lower and rear slot 45 is positioned on the inner face of the heel lug 41.

Thus the said part 80 of the strap 19 will in use be opposed to the heel of the wearer,

and will serve as a lining for the fixed, metal heel lug 41.

Consideration will now be given to the wheel and axle construction.

5 The front wheel structure 13 is housed in the front wheel frame of the front frame member 10 that is composed of the side arms 26, bridged at the top by the body portion 20 of the said front frame member 10, the
10 said front wheel frame being of U-shape with simple right-angled bends at the corners 81.

The shaft 12 is entered through the holes 37 in the side arms 26 and is of substantially
15 stud form, comprising a cylindrical body portion at the middle with threaded end portions 82, and a nut 83 is mounted on the said threaded portion 82 that engages with the outer face of the side arm 26. Also, there
20 may be a cotter pin 84 on the end portion outside the said nut 83.

Between the arms 26 and mounted on the shaft 12 there is a sleeve 85 extending along the middle and major portion of the length
25 thereof, there may be a washer 86 opposed to the inner face of each of the arms 26, as shown, and intermediate the said washer 86 and the opposed end of the sleeve 85 is a washer 87 that serves as the outer cone
30 bearing member for operatively housing the balls 88 of the ball bearing device at each end of the wheel structure 13.

The end portions of the sleeve 85 serve as the cylindrical parts of the bearings for
35 the balls 88.

The parts are constructed and arranged so that the nuts 83 can be screwed on the shaft 12 tightly, so that the sleeve 85 and the cone members 87 serve as the fixed parts
40 of the ball bearing construction.

The front wheel structure 13 is built up of two mating and similar members 89 that have their opposed edges 90 meeting along the medial line or plane, and have each on
45 the outer face a cup 91 for cooperating with the balls 88.

The cup 91 is provided in the form of a depression in a hub portion 92 and the cup 91 is made sufficiently deep to extend over
50 the periphery of the cone washer 87 and is an operative fit for the said periphery, suitably to serve as an emergency bearing on the outer side of the balls 88. Also, on the inner side of the balls 88 the opening 93 in
55 the hub portion 92 is an operative fit for the opposed portion of the sleeve 85.

The washer 86 is made to serve as a thrust bearing by being made sufficiently large, as shown, to extend beyond the opposed outer
60 face of the cone washer 87 so as to be adapted to engage with a part 94 of the opposed outer face of the wheel member 89.

Thus, as described, each individual wheel member or element 89 is adapted to operate
65 independently of the other, or to cooperate

with the other mating member so that the two operate together, substantially as one wheel.

In the case of the rear wheel structure, there is provided a rear wheel 15 on each
70 side and the wheels are each individually mounted in a special manner so as to provide a complete and self-contained structure that is ready to be mounted in a relatively simple
75 manner on the outer end portion of the shaft member 14, such as shown, or of some other suitable form, the said structure comprising a complete bearing device for the wheel 15 that serves to operatively house the said
80 wheel and means for holding the parts together.

The holding sleeve 110 fits over the cylindrical part 114 of the shaft member 14, the extreme outer end portion 115 of the said shaft member 14 being, as shown, in the
85 form of a head.

The two shaft members 14 are similar, positioned generally in alignment, and have the inner end portions 116 of semi-circular form of cross-section, with the flattened parts
90 over-lapping and pivotally connected together by means of a cotter-pin 117 that is positioned in holes that are provided in the over-lapping portions, the cotter-pin 117 being generally directed horizontally. Thus
95 the two shaft members 14 may have a limited relative swinging movement, generally in a vertical plane.

The portions 118 of the shaft members 14 adjacent and outward from the over-lapping flattened portions 116 may be of cylindrical form, and are reduced relatively to the outer cylindrical portion 114 that is housed in the holding sleeve 110 and the portion 119 intermediate these two cylindrical portions, which part is positioned in the opening 47 in the supporting arm 44 of the rear frame member 11, is of square form of cross-section, thus corresponding to the form of the said opening 47, so as
110 to be non-rotative therein, and is of such a fit therein as to permit of the slight tilting movement of the wheels 15 relatively one to the other.

In assembling the parts the wheel and
115 bearing structure that is held together by the holding sleeve 110 is mounted on the shaft member 14 positioned on the outer cylindrical portion 114, with the holding sleeve 110 in abutment with the head 115, and then the reduced portion 118 is entered through the opening 47 and the square bearing or supporting part 119 brought into position in the said opening 47.

The connecting of the over-lapping portions 116, involving the positioning of the cotter pin 117, involves a housing structure
120 that fills the space between the two side supporting arms 44 and encloses or houses the over-lapping parts 116 and all of the
130

adjacent parts of the shaft members 14 that are positioned between the said side arms 44, and the said housing structure 120 is positioned by means of the cotter-pin 117, which extends entirely therethrough.

The said housing structure, furthermore, serves as the means for limiting the relative swinging or rocking movement of the shaft members 14 and for cushioning such movement, and does these in the following manner:—the said structure comprises at the exterior a shell 121 in the form of a tube of appreciably greater diameter than that of the shaft members 14 housed therein and that is of suitable length to have the ends abut against the opposed faces of the frame supporting arms 44 and the entire interior space between the inner wall of the shell 121 and the shaft members 14 is filled with relatively soft rubber 122.

Thus the rubber 122 is adapted to provide a yielding or resilient element in the means that serve to operatively connect the shaft members 14, such as to yield under appreciable pressure of force, so that these parts are connected in a relatively flexible manner. By having the pivotal pin 117 positioned horizontally such yielding is mostly confined to movements in an approximately vertical plane.

I claim as my invention:—

1. In a roller skate, a frame structure having a heel supporting portion, a pair of wheels in spaced relation and positioned under the side edges of the said heel supporting portion, a shaft extending intermediate the said wheels, a pair of side arms for supporting the said frame structure from the said shaft connected by their lower ends to the said shaft, and the said arms being directed from the said lower ends forwardly and upwardly and connected to the body of the said frame structure in front of the said wheel receiving portion, whereby with the side arms flat and parallel and connected integrally and directly by their upper ends with the frame structure the separating distance between the arms is less than the overall width of the heel supporting portion of the frame structure.

2. A roller skate comprising a frame that is composed of two parts having overlapping portions, means for positioning the parts comprising a lug on one of the parts and a slot in the other of the parts for engaging therewith, and one of the side edges of the said slot being provided with a set of teeth for cooperating with the said lug for longitudinally positioning the parts.

3. A roller skate having a frame and a pair of toe clamping members operatively mounted thereon, said members having the outer end portions extending laterally from the said frame and provided with toe engaging means, having the body portions

slidably engaged with the under side of the frame, and having the inner end portions of said members overlapping one another and clamped to the frame by means of a clamping screw, said frame having a slot for adjustably receiving said clamping screw.

4. A roller skate as described in claim 3, the said screw being positioned in a slot in the frame, and positive locking means for the said screw being provided in the form of a lateral projection on the body portion thereof and a set of teeth along one lateral edge of the said slot for cooperating with the said projection.

5. A roller skate as described in claim 3, and the body portions of the said members being appreciably curved so as to bring the position of the clamping screw out of alignment with the two outer toe engaging end portions.

6. A roller skate having two frame members with overlapping parts, the said parts having slots in registration and with teeth along the lateral edge portions of the said slots along one side, a front heel lug member for being superimposed upon the said parts, a clamping screw serving as the means for holding together the said member and parts, and means for positioning the said member and parts comprising a lug on the said member, extending through the said slots, and adapted for selective engagement with the said teeth.

7. A roller skate having at the heel end an upstanding heel lug, said lug having a pair of slots, a heel strap rove through said slots, said slots being in spaced relation in the longitudinal direction of the strap, and said slots being generally in parallelism and positioned individually in transverse relation to such longitudinal direction, whereby opposed portions of the strap and lug will be in face to face contact, with the portions of the strap on the inner side of the lug so as to serve as a lining for the lug.

8. In a roller skate having a pair of rear wheels and having a frame structure that is provided with a pair of side arms in spaced relation, the said arms having shaft holes, a shaft structure loosely housed in the said holes, the said shaft structure being composed of two members in alignment that have overlapping portions positioned in the space between the arms, a pin serving to pivotally connect the said overlapping portions, and means for limiting the pivotal movement of the said shaft members.

9. In a roller skate as described in claim 8, the said means for limiting the pivotal movement of the shaft members being in the form of a cushion device that serves to position the said shaft members relatively one to the other and is adapted to yield under pressure to which it may be subjected under conditions of use.

10. In a roller skate, rear wheel construction comprising a pair of side frame arms having non-circular holes, a pair of shaft members positioned approximately in alignment, extending one through each of the said holes, and having a form of cross-section to correspond to the form of the said holes, a wheel structure operatively mounted on the part of the said shaft members that is exterior to the said side frame arms, the inner parts of the said shaft members that are between the said arms having their inner end portions in overlapping engagement and pivotally connected, and a housing being provided for the said inner parts consisting of a tubular shell-like structure that serves as the exterior wall structure and extends across the space between the said arms and a filling of soft rubber serving to fill the space intermediate the said tubular structure and the said inner parts of the shaft members.

11. In a roller skate, a frame structure composed of a pair of separably connected frame members, said members being each provided with slots for a holding strap, and said slots comprising for each member a pair of slots at the front end and a pair of slots at the rear end, whereby the strap for each individual member can be crossed intermediate the front and rear pairs of slots.

12. In a roller skate, a frame member forming one part of a two part frame structure, said member having slots for operatively receiving a strap device, and said slots comprising a pair of slots separated longitudinally by a second pair of slots, whereby there is permitted a crossed relation of said strap device for securing the frame member to the foot.

13. In a roller skate, a frame having an upstanding heel lug at the rear end, said lug having a pair of slots positioned so as to be adapted to have a single strap rove therethrough, whereby the material of the lug intermediate the slots may have the inner face covered by the strap so as to serve as a lining for said face.

14. In a roller skate, a frame structure having a longitudinally directed slot, a heel lug member superimposed upon the said frame structure and having a downwardly directed connecting lug for engaging with the said slot, and the said lug being generally of L-shape, comprising a laterally directed wing on one side and a straight edge at the other side.

15. In a roller skate, a frame structure that is composed of a pair of frame members having overlapping parts, one of the said parts having a slot, a lug structure for positioning the said frame members positioned in the said slot, and the said lug structure being L-shaped, comprising a straight edge on one side and a laterally directed wing on the other side.

16. In a roller skate, a frame structure made of sheet metal and composed of a plurality of parts, one of the said parts having a slot for adjustably receiving another part, and one edge of the said slot being provided with teeth for engaging with positioning devices on the said other part.

17. In a roller skate as described in claim 16, the said positioning device being in the form of a bolt, having a tooth in the form of a lateral projection on the body portion that is adapted to enter within the spaces between the said teeth.

EMERY EASTMAN HARDY.