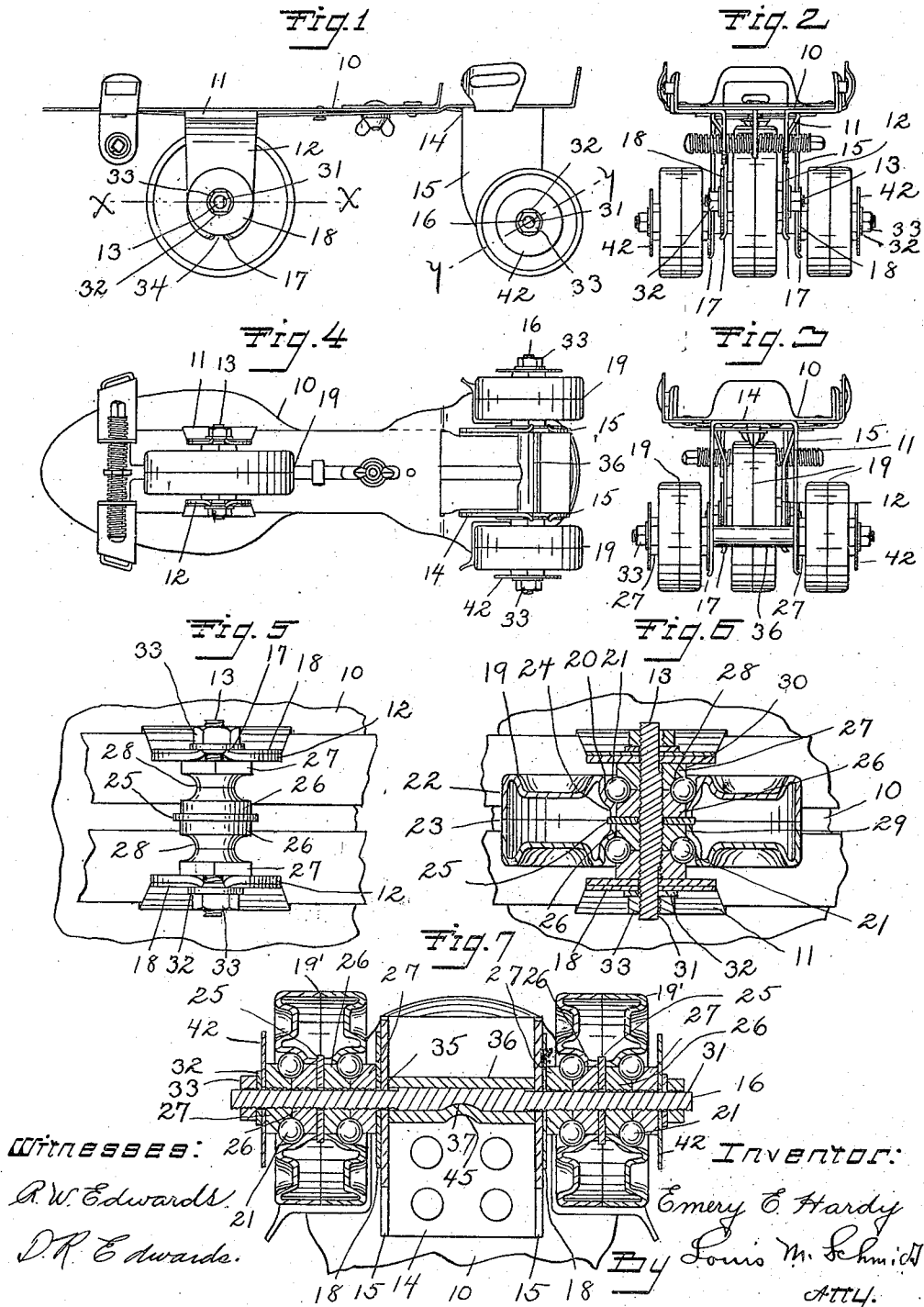


E. E. HARDY.
 ROLLER SKATE.
 APPLICATION FILED MAR. 18, 1916.

1,228,111.

Patented May 29, 1917.
 3 SHEETS—SHEET 1.



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 D. R. Edwards.

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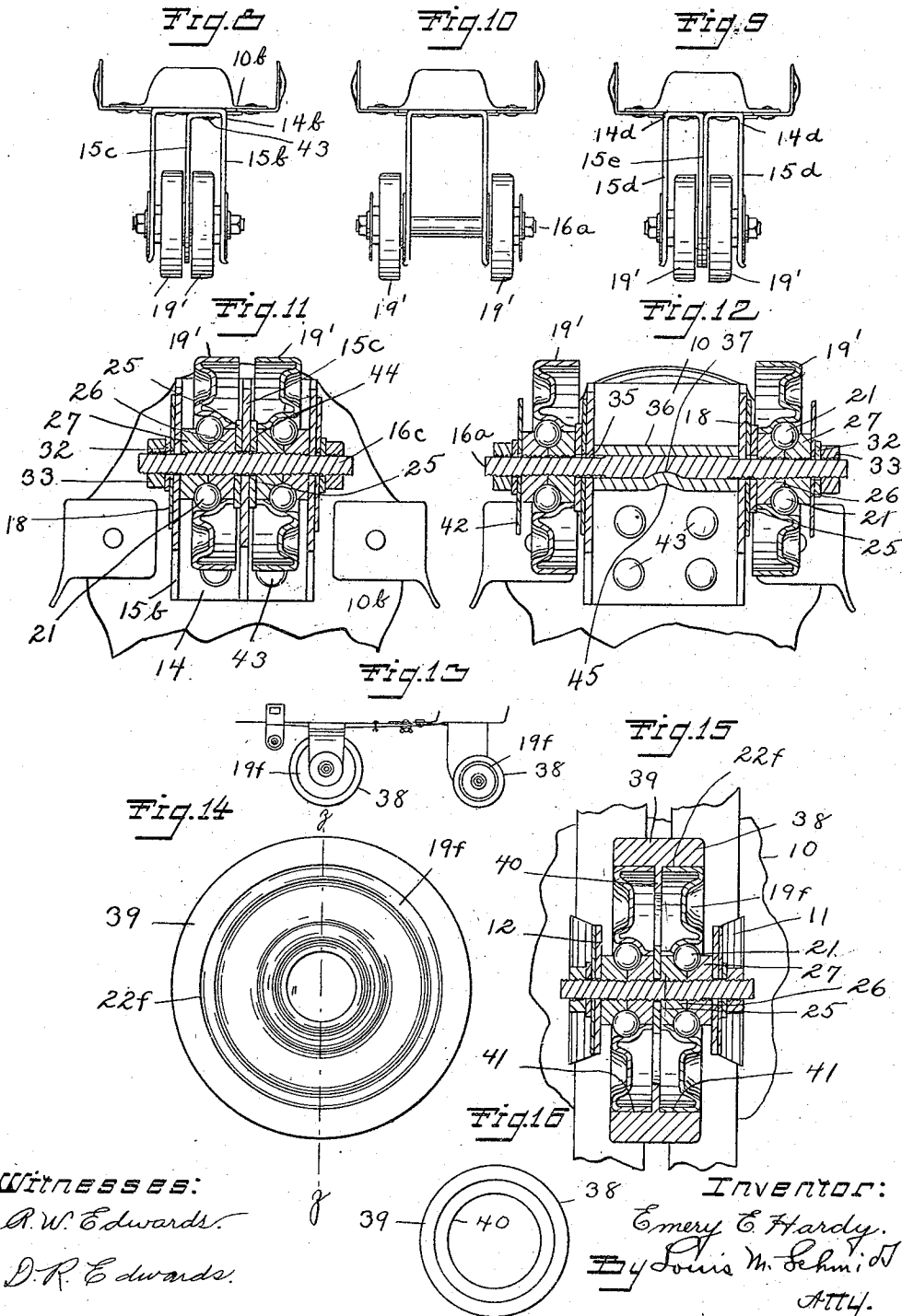
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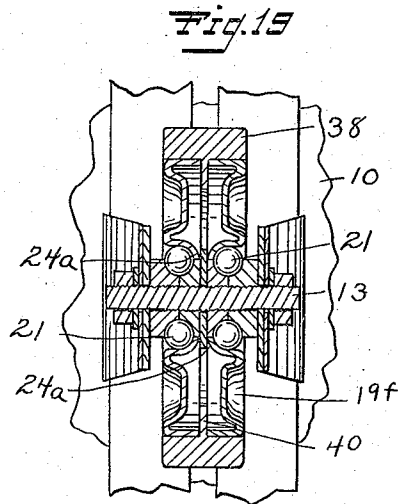
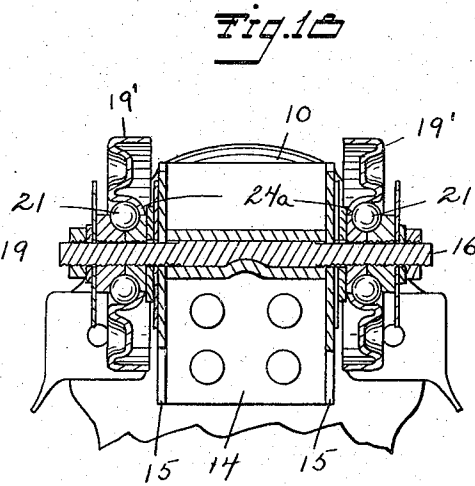
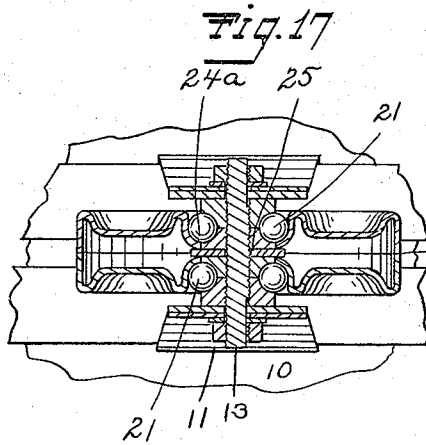
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UNITED STATES PATENT OFFICE.

EMERY E. HARDY, OF BAYSIDE, NEW YORK.

ROLLER-SKATE.

1,228,111.

Specification of Letters Patent.

Patented May 29, 1917.

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To all whom it may concern:

Be it known that I, EMERY E. HARDY, a citizen of the United States, residing at Bayside, in the county of Queens 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, and the object of my improvement is to improve the wheel and bearing construction features.

In the accompanying drawing:—

Figure 1 is a side elevation of a roller skate embodying my invention.

Fig. 2 is an end view of the same.

Fig. 3 is an end elevation of the other end.

Fig. 4 is a bottom view of the same.

Fig. 5 is a bottom view, on an enlarged scale, of the front wheel bearings and adjacent parts, the front wheel members being omitted.

Fig. 6 is a sectional view on the line *x x* of Fig. 1.

Fig. 7 is a sectional view on the line *y y* of Fig. 1.

Fig. 8 is a rear elevation on the same scale as Fig. 1, of a modified form of rear wheel construction.

Figs. 9 and 10 are similar views of other modifications.

Figs. 11 and 12 are sectional views corresponding to that shown in Fig. 7 of the modifications shown in Figs. 8 and 10 respectively.

Fig. 13 is a side elevation on a considerably reduced scale of a skate showing modified forms of wheel constructions.

Fig. 14 is a side elevation, on the same scale as Fig. 6, of the front wheel structure shown in Fig. 13.

Fig. 15 is a sectional view on the line *z z* of Fig. 14.

Fig. 16 is a side elevation on a reduced scale of the cushion member shown in Figs. 14 and 15.

Fig. 17 is a sectional view, corresponding to Fig. 6, and on the same scale, showing another modified form of front wheel construction.

Fig. 18 is a sectional view corresponding to Fig. 12, showing the modified form of wheel construction shown in Fig. 17 applied to the form of rear wheel construction shown in the said figure.

Fig. 19 is a sectional view showing the

same form of wheel construction applied to the cushion wheel shown in Fig. 15.

My improved roller skate comprises certain general features of construction which may correspond more or less to the form of construction shown and described in my Patent No. 1,152,813 dated Sept. 7, 1915, such as the frame 10 and the means for securing the same to the foot and the supporting means on the lower side for connecting the frame with the shafts for the wheels, comprising U-shaped frame supports, respectively the frame support 11 at the front side having side arms 12 for connecting with the front shaft 13, and the rear frame support 14 having side arms 15 for connecting with the rear shaft 16. Also the tip ends 17 of the arms 12 and 15 are turned outwardly to engage with a positioning washer 18, as in the patent referred to.

The bearings and the wheels mounted on the shafts 13 and 16 are of special construction, as will be described herewith.

The details of the construction for the front wheel and the rear wheel for the style shown in Fig. 1 are similar except for size. Considering the front wheel, the same is composed of two similar and independently mounted members 19 preferably made of a single stamping of sheet metal, and having at the middle a raceway 20 for a single row of balls 21. The periphery 22 may be cylindrical for a short distance, suitably to form a tread, and is in the form of an inwardly directed flange, the free edge of which meets and is in bearing engagement with the edge of the mating wheel member 19 opposed thereto, as shown at 23 in Fig. 6.

At the middle the material is curved suitably to form the raceway 20 and at the inner end of the said raceway there is an inwardly directed, diminutive, cylindrical flange 24, the inner free edge of which abuts and is in bearing engagement with the washer 25 which fills the space between the said diminutive flanges 24 on the mating wheel members 19.

The raceways 20 of the two mating wheel members 19 are on the outwardly disposed sides thereof, so that the individual wheel members 19 are positioned by the balls 21 on one side and the central washer 25 on the other side, and each independently of the other.

The bearing construction for the balls 21

is such as to provide a rigid and positively positioned raceway for each set of balls, and is formed in each case of a pair of cone members, respectively an inner cone member 26 and an outer cone member 27, each having a cone surface 28.

The inner cone member 26 has a cylindrical periphery 29 that fits inside the diminutive flange 24 that is opposed thereto.

Both of the cone members 26 and 27 are internally screw-threaded to fit the thread on the shaft 13.

The periphery 30 of the outer cone member 27 is hexagonal, suitably to be engaged with a wrench.

The shaft 13 has the end portions flattened as shown in Fig. 6, at 31, for an appreciable distance, suitably to receive a washer 32 with a non-circular hole that fits over the same.

Nuts 33 on the ends of the shaft 13 hold the bearing parts together and in position on the frame supporting arms 12.

In the assembly of the bearing parts the central washer 25 is placed at the middle of the shaft 13 and the two inner cone members 26 are screwed onto the shaft and brought to bear against the said central washer 25, the raceway 28 being on the side remote from the central washer 25. Then the wheel members 19 are placed in position, with the diminutive flanges 24 engaged with the central washer 25 and the periphery 29 of the inner cone members 26. The outer cone members 27 are next screwed onto the shaft 13, and while still separated from the inner cone members the balls 21 are slipped into place between the opposed raceways 28, after which the outer cone members 27 are screwed tightly against the inner cone members 26.

Then the shaft ends are slipped into the slots 34 in the arms 12 of the support, the flattened side 31 being in engagement with one of the walls of the said slot, after which in order there are placed on the shaft the positioning washers 18 in abutment with the outer faces of the arms 12, the washers 32 with the flat sided holes, and finally the clamping nuts 33.

It will thus be noted that the wheel members 19 are each independently supported by its individual ball bearing, so that each may operate independently of the other, and they may operate also together essentially as a single wheel. Such independent operation would occur when turning corners and coöperation as a single wheel would take place in a straight away movement, or whenever the peripheral speed of the two wheel members happens to be the same.

In the case of the rear wheels, these are mounted on the end portions of the shaft 16, the said end portions being screw threaded, and having a flat side 31, fitting the slot 35 in the arm 15. A positioning sleeve 36

is mounted on the middle portion of the shaft 16, the said sleeve and shaft being secured together by indentations 37 and 45 that are in registration, and the sleeve fitting between the arms 15. On each side the end of the sleeve abuts with the inner face of the arm 15 and the positioning washer 18 is opposed to the outer face thereof, and one of the hexagonal headed cone members serves as a clamping nut to hold these parts in position. The said last named cone member 27 serves also as one of the outer cone members of a set of bearing members precisely like that described for front bearing construction, comprising in order the so-called outer cone member 27, which is positioned on the inner side of the complete bearing structure, an inner cone member 26 opposed thereto, a central washer 25, a second inner cone member 26, a second outer cone member 27, thus completing the bearing structure proper. Outside the last named outer cone member 27 there is a finishing washer 42, the locking washer 32 with the non-circular hole, and finally the clamping nut 33.

The wheel members 19' ride on the balls 21 in the raceways 28.

In some cases a single wheel member 19 or 19' may be used instead of two or the duplex construction as described above. Examples of such construction are shown in Figs. 8, 9, and 10, as applied to the rear wheels.

In Fig. 10 the wheel members 19' are positioned on the end portions of the shaft 16^a, as in Fig. 7, and the bearing construction is changed to correspond, as shown in the sectional view in Fig. 12. This differs from the construction of the said Fig. 7 in the omission of the innermost wheel member 19' and the corresponding set of balls 21, the so-called outer cone member 27, and the inner cone member 26, the so-called central washer 25 bearing against the positioning washer 18.

In the construction shown in Fig. 8 the two wheel elements 19' are positioned between the arms 15^b instead of at the outer sides thereof, the frame connection or support 14^b being U-shaped and reinforced by a third arm 15^c positioned between the wheel members 19' and secured to the frame by one of the rivets 43 which holds the U-shaped support 14^b to the said frame 10^b. The bearing construction differs from that shown in Fig. 6 in the use of the said third arm 15^c, which has a slot 44, as shown in Fig. 11, for engaging with the shaft 16^c and in the use of two of the central or end bearing washers 25, one for each wheel member 19' and on each side of the said third arm.

In the construction shown in Fig. 9 there are two U-shaped supports 14^d, one for each wheel member 19', whereby the third arm, 130

between the two wheel members is composed of two of the arms, 15^e, side by side, the other arm, 15^d, of each support 14^d serving as the outside arm, one on each side.

5 The special feature of the skate shown in Fig. 13 resides in the wheels, combined with the bearing construction that applies particularly to the duplex or double wheel construction, and involves the use of a rim 38
10 of some form of cushioning material, such as hard rubber, which can be turned or molded to shape. The wheel members 19^f are of reduced diameter to allow for the thickness of the rim 39 or rim proper, and
15 the opposed free edges of the tread 22^f are separated by a space suitable to admit between them an annular depending flange 40 that extends inwardly as a web from the middle of the said rim proper 39. The tread
20 22^f fits against the inner surface of the rim proper 39.

Accordingly the interior of the cushion member 38 is divided by the central, flange-like wall 40 into two circular chambers 41.
25 The wheel members 19^f fit within these chambers, as shown in Fig. 15.

Preferably the web 40 is of the same thickness as the central or end bearing washer 25.

30 In the modifications shown in Figs. 17, 18, and 19 a different style of wheel member is shown, and applied to the wheel arrangements shown in Figs. 6, 12, and 15, the same difference appearing in all, and residing in the omission of the cylindrical form of flange 24, and referred to as a diminutive
35 flange, and which serves as the intervening member between the balls 21 and the end bearing washer 25 in the styles heretofore described, and in using in lieu thereof, as shown at 24^a, simply the thickness of the material of which the wheel member is made. This permits of a narrower form of
40 wheel construction.

45 It will be noted that with a given set of parts made as described there is no provision for adjustment, and that the parts must be made correctly to operate properly, the obvious consequence of this arrangement being that there is no chance for mis-adjustment, or for change after once being put
50 together, or binding the parts. If the parts are put together to run freely they will remain so.

55 I claim as my invention:—

1. In a roller skate, a shaft provided with a raceway, a set of balls in the said raceway, and a wheel member operatively mounted on the said shaft by means comprising in
60 combination a raceway on the said wheel member engaged with the said balls that is open on one side and a fixed bearing engaged with the other side of the said wheel.

2. In a roller skate, a wheel member hav-

ing a raceway that is open on one side, a
65 shaft having a ball bearing, the said ball bearing comprising a single row of balls, means for operatively mounting the said wheel member on the said shaft with the
70 said balls engaged with the said raceway comprising in combination with the said raceway a fixed bearing engaged with the other side of the said wheel.

3. In a roller skate, a duplex wheel structure comprising two opposed separate wheel
75 members, each having a raceway that is open on the outer side, a shaft passing through the said members, cone members mounted on the said shaft combining to form a pair of generally V-shaped raceways,
80 means for securing the said cone members on the said shaft so that the said V-shaped raceways are in fixed spaced relation, and a set of balls positioned in each of the said V-shaped raceways and coöperating each
85 with one of the said raceways in the wheel member.

4. In a roller skate, a cushion wheel structure comprising a pair of wheel members,
90 a shaft, means for operatively mounting each of the said wheel members on the said shaft, independently of the other, and a cushion member mounted on the peripheries of the said wheel members.

5. In a roller skate, a shaft, a pair of cone
95 members mounted on the said shaft, and having coöperating cone surfaces forming a raceway, balls in the said raceway, one of the cone members having a cylindrical periphery, a bearing washer on the said shaft
100 and positioned in abutment with the last named cone member, and a wheel member having a raceway engaged with the said balls and having a portion that fills the
105 space between the said balls and the said bearing washer and engages with the said cylindrical periphery.

6. A roller skate having a duplex wheel structure comprising a shaft, a bearing
110 washer mounted thereon, inner cone members positioned one on each side of the said washer, outer cone members in abutment with the said inner cone members, a row of balls engaged with each of the opposed cone
115 pairs, and wheel members positioned one between each of the said rows of balls and the said bearing washer and having a raceway engaged with the opposed row of balls.

7. In a roller skate, a wheel composed of a single piece of sheet material comprising a
120 flat, annularly, and radially positioned body portion, a tread portion at the periphery of the said body portion, a bearing portion at the interior edge of the said body portion, and the said bearing portion being in the form
125 of a racewaysuitable for engaging with a single row of balls and the said bearing portion having on the inner edge, on the side

remote from the said raceway, a bearing edge portion suitable to serve as a positioning member in coöperation with a set of balls engaged with the said raceway.

- 5 8. In a roller skate, a cushion wheel structure comprising a shaft, a pair of wheel members operatively mounted on the said shaft, each independently of the other and in juxtaposition, one to the other, and in
10 spaced relation, a cushion member mounted on the said wheel members, comprising a

tread portion resting on the peripheries of the said wheel members and a positioning flange of annular form extending inwardly from the said tread portion and positioned 15 between the opposed faces of the said wheel members.

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Witnesses:

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ELIZABETH J. CRANDALL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."