E. E. HARDY.

ROLLER SKATE.

APPLICATION FILED AUG. 9, 1920.

1,406,643. Patented Feb. 14, 1922.

Fig. 1.

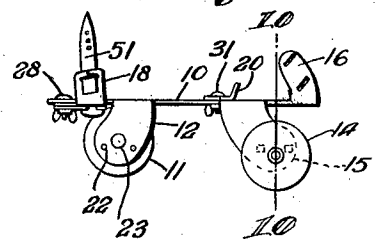


Fig. 2.

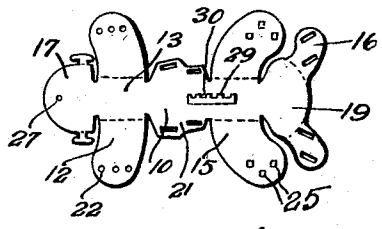


Fig. 3.

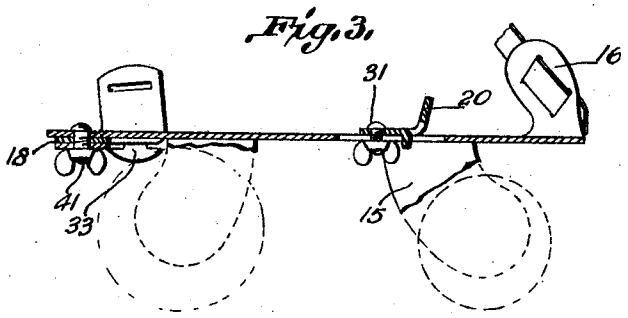


Fig. 4.

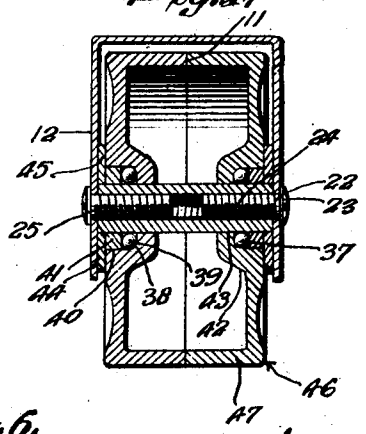


Fig. 5.

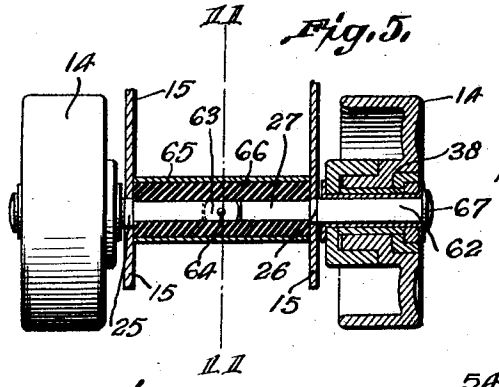


Fig. 6.

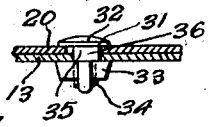


Fig. 11.

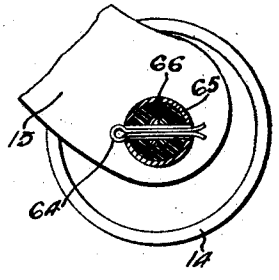


Fig. 7.

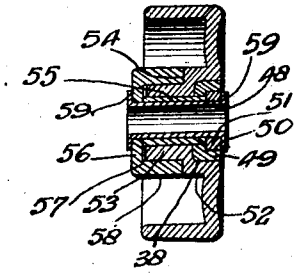


Fig. 9.

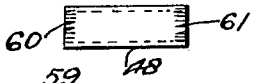
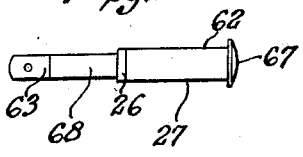


Fig. 8.



Fig. 10.



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Atty.

UNITED STATES PATENT OFFICE.

EMERY EASTMAN HARDY, OF BROOKLYN, NEW YORK.

ROLLER SKATE.

1,406,643. Specification of Letters Patent. Patented Feb. 14, 1922.

Original application filed January 15, 1920, Serial No. 351,580. Divided and this application filed August 9, 1920. Serial No. 402,367.

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; 1,276,212; and 1,345,848; and also in certain applications filed by me, to wit:—Serial Nos. 351,579; 351,580; and 402,368; and is divisional of application 351,580 mentioned and filed January 15, 1920, and the object of the particular improvement herein shown and described is to effect improved forms of construction and arrangement pertaining to details of hub structures and wheel mountings.

In the accompanying drawing:—

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

Figure 2 is a plan view of the blank for the frame member.

Figure 3 is a longitudinal sectional view, on an enlarged scale.

Figure 4 is a sectional view, on a still further enlarged scale, through the front shaft.

Figure 5 is a sectional view on the line 10—10 of Fig. 1.

Figure 6 is a sectional view through the clamping bolt for the front heel lug member.

Figure 7 is a sectional view of the bearing and wheel structure shown in Fig. 5, removed from the shaft member.

Figure 8 is an end elevation of the filling washer shown in Fig. 7.

Figure 9 is a side elevation of the holding tube shown in Fig. 7.

Figure 10 is a side elevation of one of the rear shaft members.

Figure 11 is a sectional view on the line 11—11 of Fig. 5, showing the cotter pin that holds the two shaft members together and adjacent parts.

My improved roller skate comprises a frame 10 that is made of one piece of sheet material, is supported at the front end by the front wheel structure 11 by means of a pair of front side arms 12 that are integral with the frame body 13 and at the rear end by a pair of rear wheels 14 by means of a pair of rear side arms 15 that are also integral with the said frame body 13, and has on the rear end of the frame a pair of integral fixed heel lugs 16.

Operatively mounted on the front end portion 17 of the frame 10 is a pair of toe clamping lugs 18 and adjustably mounted on the frame in front of the heel space 19 at the rear end portion is the front heel stop member 20.

Considering the blank for the frame member, shown in Fig. 2, the body portion 13 extends from end to end, comprises at the rear end portion the heel space 19 and at the front end the front end portion 17, already mentioned, and intermediate these parts are the front arms 12 adjacent the front end portion 17, the rear arms 15 adjacent the heel space 19, and between the said arms, and at about the middle, is the middle connecting portion 21.

The arms 12 and 15 have a plurality of pairs of mating holes for the shaft devices for alternative use, for providing a choice for positioning the said devices for changing the length of the wheel tread or base, there being, as shown, three holes in each of the said arms. The holes 22 in the front arms 12 are round, for receiving the shaft screw 23 that holds in place the shaft 24 for the front wheel structure 11, the said shaft 24 being of tubular form and threaded suitably to receive the said screw 23.

The holes 25 in the rear arms 15 are square to provide an operative fit for the square portion 26 of the rear shaft part 27 that is housed therein.

The front end portion 17 is provided with a hole 27 for the toe clamping bolt 28, for the toe clamping members 18.

The body portion 13 is provided in the portion in front of the heel space 19 with a longitudinal slot 29 along the axis, the border edge of which on one side, on the right side, as shown, has a series of teeth 30.

The heel lug clamping bolt 31 is entered into position from the upper side, the head 32 engaging with the upper face of the body portion of the heel lug member 20, and a wing nut 33, mounted on the threaded lower end portion 34, engages with the under face of the body portion 13 of the frame 10. Intermediate the head 32 and the threaded portion 34, is a short body portion 35, having a length about the same as or slightly less than the combined thickness of the material of

the body portion of the heel lug member 20, and that of the frame body 13. A projection or tooth 36 engages with the projection from the said body portion 35 of the bolt 31.

As to the wheel structures, these may be provided with balls in the bearing devices or a bearing device may be provided without using balls. As shown, balls 37 are used in the bearings for the front wheel structure, shown in section in Fig. 4, and the bearing structure for the rear wheels 14 is such that balls can be used but in the construction and arrangement shown the space in which the balls could be housed is filled by substitute filling devices, as seen in Figs. 5 and 7.

The wheel proper in all cases is made of sheet material and has a hub structure that is provided with a recess or chamber 38 extending inwardly from the outer face that serves as a chamber that is substantially the same for the front and the rear wheels. In the case of the front wheel structure 11 the balls 37 are housed in the inner part 39 of the said recess or chamber 38 and the outer portion 40 thereof is closed by a washer structure 41 that serves as the outer cone member in cooperation with the balls 37.

In the case of the front wheel structure 11 the hub structure 42 has an opening 43 in the inner end wall of the recess or chamber 38 that fits over the shaft tube 26 and is adapted to serve as an emergency bearing.

Also, on the outer side of the balls 37 the border wall of the outer portion 40 of the recess or chamber 38 that is opposed to the periphery of the cone washer structure 41 is adapted to cooperate therewith as a bearing.

A washer 44 may be positioned between the outer face of the cone member 41 and the supporting arm 12, the opening therein fitting over the shaft 26, the said washer 44 being sufficiently large to extend over the mouth of the recess or chamber 38 and have the outer portion 45 positioned in opposition to a part of the outer face of the wheel structure.

The front wheel structure 11 is composed of two similar wheel devices 46 made of sheet material that are positioned so that the edges of the rim or tread portion 47 meet along the median line and the recesses 38 are outwardly disposed, the hub structures 42 being mounted on the tubular shaft 26 and being each provided with the bearing structure described.

The tubular shaft 26 may be threaded on the interior for the entire length, as shown, so that a holding screw 23 may be inserted in each end, the ends of the tubular shaft 26 being in abutment with the arms 12, so that a rigid connection with these arms 12 is made by means of the two screws 23 in the ends.

In the case of the rear wheels, each of the two individual wheels 14 is incorporated with a bearing structure in such a way as to form a complete and operative device that is held together by means of a tubular element 48 and that is adapted to be mounted as a unit on one of the shaft parts 29, as is shown in Fig. 7.

The cup or recess 38 is filled by two pieces, comprising a cupped washer 49 that fits and fills the border wall thereof as a lining and has a recess 50 on the outer face and which fills in part of the space along the axis. The remainder of the space along the axis is filled by a flat washer 51. The recess 38 is on the outer side of the hub structure 52 and the inner portion thereof is in the form of a sleeve 53 that extends along the axial portion inwardly from a shoulder 54 at the junction of the said sleeve 53 and the body portion of the hub structure 52.

The sleeve 53 and the filling washer 49 are operatively mounted on a sleeve 55 and which serves as a bearing therefor.

On the inner end portion of the hub structure 52 is a cup structure 56 that fits thereover, and comprises an end wall or body portion 57 that abuts against the inner end of the bearing sleeve 55 and is opposed to the inner end of the sleeve 53 and a sleeve portion 58 that fits over the sleeve 53 and abuts against the shoulder 54.

The cup structure 56 is a fixed member and serves as a bearing device for the opposed parts of the wheel member 14.

The holding tube 48 is of bendable thin metal, has the body portion extended through the fixed parts of the wheel mounting, comprising the bearing sleeve 55, at the middle of the body 57 cup structure 56 being at the one end and the end washer 51 at the other end.

The heads 59 of the holding tube 48 are formed, as shown, by bending outwardly the plurality of fingers 60 that are formed at the ends of the tube 48 by means of longitudinal slits 61.

The bore of the holding tube 48 is a fit for the cylindrical outer end portion 62 of the shaft part or member 27 on which it is mounted.

The complete rear shaft structure is composed of two similar shaft parts 27 that are positioned in alignment and have at the middle of the shaft structure overlapping parts 63 that are connected together so as to permit of a relative pivotal movement by means of a pivotal pin that is positioned in suitable holes in the overlapping parts 63, a cotter-pin 64 being used for this purpose in the structure shown, the said cotter-pin being elongated and extending also through an exterior housing structure, composed of a tube 65 and a filling structure 66.

Each shaft member 27 comprises a head 67 at the outer end; the overlapping part 63 at the inner end; the square supporting portion 26 adjacent the middle; the cylindrical portion 62 for receiving the tubular holding part 48 of the combined wheel and bearing unit between the said square supporting portion 26 and the head 67 at the outer end; and a reduced, cylindrical connecting portion 68 intermediate the said square supporting portion 26 and the overlapping portion 63 the said connecting portion 68 and the overlapping portion 63 being the parts that are enclosed by the housing structure mentioned, and to be described.

The said housing structure fits in and fills the space between the side arms 15 of the frame 10, the tubular exterior 65 serving as a casing and being of appreciable diameter, so that the interior wall is separated from the enclosed parts of the shaft members 27 by an appreciable space, and the said space is filled by the filling material 66, which is of soft rubber. Thus the filling material 66 is such as is adapted to yield, responsive to pressure of the shaft parts housed therein, so that the said shaft parts are free to tilt or swing relatively one to the other within limits determined by the structure of the housing, and the rear wheels are mounted on a yielding and resilient structure that permits of a limited relative rocking movement for the two wheels.

I claim as my invention:—

1. A roller skate comprising a frame having a body, a front wheel structure positioned under the front end portion of the said body, a pair of side arms extending downwardly from the said body in spaced relation, a shaft extending through the said wheel structure and having the ends in abutment with the said arms, and the said shaft being of tubular form, having the interior screw-threaded and provided with holding screws at the ends for connecting with the said side arms.

2. A roller skate having a rear wheel structure and bearing devices therefor combined in a unitary device, comprising a bearing sleeve, a wheel proper having a hub portion provided with a bore that fits over the said sleeve, positioning devices at the ends of the said hub portion and in engagement with the end portions of the said sleeve, and means for operatively holding together the said sleeve and positioning devices comprising a tubular structure, having the body portion extended through the said sleeve and also through the said positioning devices, and having the ends outwardly flanged for engaging with the outer faces of the said positioning devices.

3. In a roller skate, a frame having a pair of downwardly directed side arms for connecting with a wheel shaft, being in parallelism and in spaced relation, the said wheel shaft being extended across the space between the arms, with the ends in abutment with the said arms, a wheel operatively mounted on the said shaft, the said shaft being of tubular form and having interior threads that extend inwardly from the ends, and a holding screw on each side, extended through openings in the said arms and having engagement with the said interior threads, whereby the said arms and shaft are held rigidly together.

EMERY EASTMAN HARDY.