April 7, 1925. 1,532,784

A. L. STAPLES

SKATE ROLL

Filed June 17, 1922

Fig. 2.

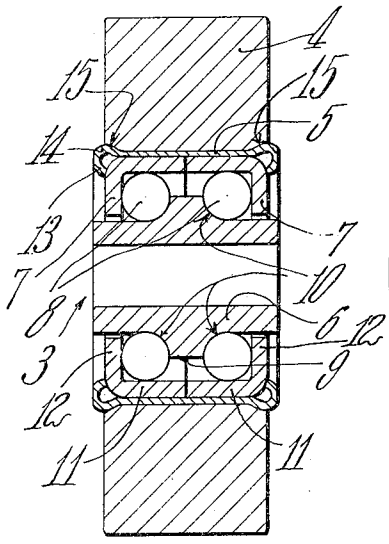
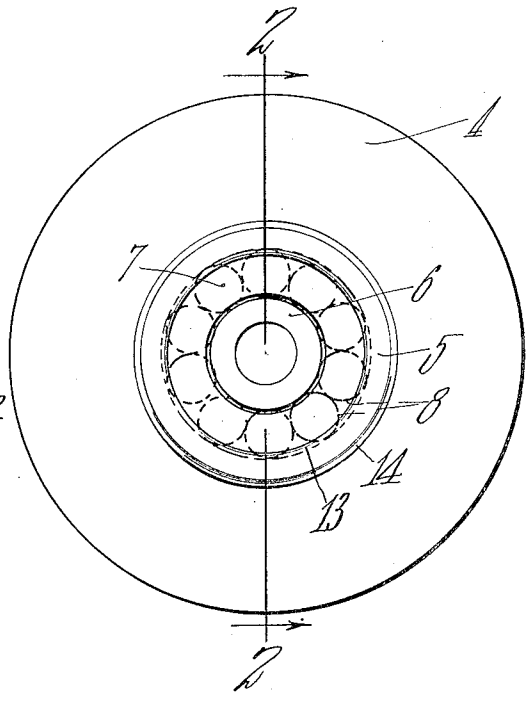


Fig. 1.



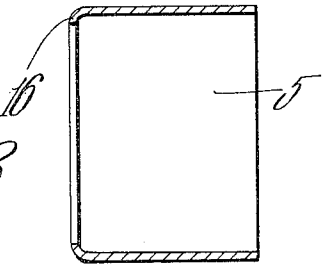


Fig. 3.

INVENTOR
Arthur L. Staples
BY Chapin & Neal
ATTORNEYS

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UNITED STATES PATENT OFFICE.

ARTHUR L. STAPLES, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO WINCHESTER REPEATING ARMS COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

SKATE ROLL.

Application filed June 17, 1922. Serial No. 569,103.

To all whom it may concern:

Be it known that I, ARTHUR L. STAPLES, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in Skate Rolls, of which the following is a specification.

The present invention relates particularly to skate rolls which are provided with self-contained anti-friction bearing units.

One object of the invention is to provide improved means for retaining in assembled relation the constituent parts of an anti-friction bearing unit for skate rolls.

Another object of the invention is to provide improved means for securing the bearing unit of a skate roll to the tread-forming member thereof.

With the above stated objects in view, one feature of the invention consists in providing, between the tread-forming member and the bearing unit of a skate roll, a retaining sleeve or ring constructed and arranged to perform the dual function of holding together the several parts of the bearing unit and also securing said unit to the tread-forming member so that the whole will constitute a permanently assembled, unitary structure.

Further objects and advantages of the invention will appear in the following description and the features of construction by which the objects are attained will be explained in connection with the accompanying drawings which show the invention in its preferred form. Although the invention has been illustrated in its application to skate roll construction it is not necessarily limited thereto, but is capable of embodiment in other devices such as wheels or rollers of various kinds which are fitted with anti-friction bearing units.

In the drawings:

Fig. 1 is a view, in side elevation, of a skate roll having an annular tread-forming member and a central ball-bearing unit constructed and secured together in accordance with the present invention to form a single self-contained structure;

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1; and

Fig. 3 is a longitudinal sectional view of the retaining sleeve in its preferred form as it appears before being assembled with the other parts of the skate roll.

Referring to the drawings, the skate roll therein shown comprises a central ball-bearing unit indicated by the general reference numeral 3, an annular tread-forming member 4 which encircles the bearing unit, and a retaining sleeve or ring 5 which is interposed between the bearing unit and the tread-forming member and functions both to retain in assembled relation the component parts of the bearing unit and to secure the bearing unit permanently to the tread-forming member.

The bearing unit 3 consists of an inner bearing ring or cone member 6, a pair of surrounding ball cups or outer bearing rings 7, and two parallel series of bearing balls 8 which are interposed between the cone member and the ball cups. As shown, the cone member 6 is made in the form of a sleeve adapted to be carried by an axle or trunnion of a roller skate. The exterior of the cone member is provided with a centrally located circumferential ridge 9, the opposite lateral faces of which are toroidal, forming two parallel, outwardly facing, inner ball races 10 for the bearing balls 8. The ball cups 7 are duplicates, each having a cylindrical side wall 11 and a flattened bottom or end wall 12. The ball cups are arranged with the rims of the side walls abutting and the end walls parallel to each other and engaging the outer sides of the balls to retain the balls in place. The construction is such that the inner faces of the side and end walls of each ball cup cooperate to provide an outer ball race for the respective series of balls. The bottom or end walls of the ball cups are apertured to enable the opposite ends of the cone member 6 to project therethrough, the diameter of the apertures being sufficient to insure that the ball cups will rotate without contact with the cone member.

The tread-forming member 4 is of the usual annular form and may be constructed of so-called "hard fibre" or other appropriate material. The inner diameter of the annular tread-forming member is made just large enough to accommodate the retaining sleeve 5 between said member and the ball cups.

After the various parts have been assembled in the relation shown in Fig. 2, the opposite ends of the retaining sleeve 5 are subjected to crimping actions which form inner and outer annular bulges 13 and 14 re-

spectively. The inner bulge 13 overlaps the ball cups, holding them with their adjacent rims abutting so that all parts of the bearing unit are maintained in assembled relation. The outer bulge 14 projects beyond the cylindrical inner surface of the tread-forming member and securely locks the bearing unit to the tread member. In crimping the opposite ends of the retaining sleeve 5, the inner bulges 13 are formed first, the edges of the sleeve being crimped inwardly against the adjacent bottom or end of the respective ball cups. The reaction between the crimping force applied to the retaining sleeve and the resistance offered by the ball cups after the edges of said sleeve have been turned over into contact with said cups, forces the material of said sleeve to crimp outwardly to form the outer bulge 14. As the outer bulges 14 are formed, they engage the opposite edge portions of the tread-forming member and embed themselves therein, compressing the material of the latter as shown clearly at 15 in Fig. 2, and thus insuring that the retaining sleeve 5 will be firmly anchored in the central recess of the tread-forming member. When both ends of the retaining sleeve have been crimped the ball cups will be held with their rims pressed tightly together.

It has been found advantageous to produce the retaining sleeves from flat metal blanks by first stamping or drawing the same into cup form and then cutting away all but the marginal portion of the bottom of the cup thereby forming a sleeve such as that shown in Fig. 3, said sleeve having an inwardly turned rim 16 at one end thereof. With a sleeve preliminarily shaped as shown in Fig. 3, it will be apparent that the desired inner bulge at one end of the sleeve is partially formed before the sleeve is subjected to the action of the crimping dies. Consequently, the bulge may be shaped into its ultimate form more easily than would be the case with a sleeve having no such inwardly turned rim when it is applied to the crimping die. The inwardly turned rim 16 engages with one of the ball cups while the parts of the bearing unit are being assembled and functions to locate said parts in proper relation to one another preparatory to the crimping operations which are subsequently to be performed upon the ends of the retaining sleeve.

From the foregoing description, it will be understood that at the completion of the crimping operations upon the retaining sleeve 5, all the constituent parts of the skate roll will be locked in the desired assembled relation to provide a self-contained unitary structure. It will be evident that the adjustment of the parts of the bearing unit will be determined by the length of the retaining sleeve and that after the ends of the sleeve have been crimped to provide the double locking bulges 13 and 14, the parts of the bearing unit will be assembled in permanently adjusted relation.

The invention has been disclosed herein for illustrative purposes in an embodiment at present preferred but the scope of the invention is defined by the appended claims rather than by the foregoing description.

What is claimed and desired to secure by Letters Patent is:

1. In a skate roll in combination, an annular tread member, an antifriction bearing comprising an inner bearing ring and two outer bearing rings provided with cooperating ball races having balls therein and a locking sleeve interposed between said outer bearing rings and said annular tread member, said sleeve having enlargements extending both outwardly and inwardly at each end thereof for both retaining the outer bearing rings together and for securing the tread member thereon.

2. In a skate roll, the combination of an annular tread unit, a central bearing unit, and a sleeve-like member interposed between said units and having its opposite ends enlarged both outwardly and inwardly to engage and bind together said units into a self-contained unitary structure.

3. In a skate roll in combination, an annular tread member, an antifriction bearing comprising an inner bearing ring provided with two ball races, two outer bearing rings each having a ball race cooperating with one of the races on said inner ring, a double row of balls in said races and a locking sleeve interposed between said outer rings and said annular tread member, said sleeve having enlargements extending both outwardly and inwardly at each end thereof for engaging portions of each outer bearing ring and portions of said tread member to retain said outer bearing rings together and to secure the tread member thereon.

4. In a skate roll, the combination of an antifriction bearing unit having a plurality of component parts, an annular tread-forming member encircling said bearing unit, and a retaining sleeve interposed between said member and said unit and having its opposite ends enlarged both outwardly and inwardly to bind together said bearing unit and tread-forming member so that the whole will constitute a single self-contained structure.

5. In a skate roll, the combination of an annular non-metallic tread unit, an antifriction bearing unit, and a sleeve-like metallic locking member interposed between said units and having its opposite ends enlarged both outwardly and inwardly for engaging both said bearing unit and said tread unit thereby locking said units together into a unitary self-contained structure.

6. In a skate roll, the combination with an annular tread-forming member, of a ball-bearing unit comprising, a cone member having a central annular enlargement and two parallel ball races one at each side of said enlargement, two ball cups encircling said cone member and arranged with their rims abutting, each cup providing ball races for cooperating with one of the ball races of the cone member, and a series of bearing balls between each set of cooperating ball races; a retaining sleeve fitting the outer circumferential surfaces of said ball cups, inner annular bulges at opposite ends of said sleeve overlapping the bottoms of the ball cups for holding said cups in abutting relation and thereby maintaining in assembled relation all parts of the bearing unit, and outer annular bulges at opposite ends of said sleeve overlapping the sides of said tread-forming member to secure together said member and said bearing unit.

7. A ball-bearing unit comprising a cone member having a central annular enlargement and two parallel ball races one at each side of said enlargement, two ball cups encircling said cone member and arranged with their rims abutting, said cups providing ball races for cooperating with the ball races of the cone member, a series of bearing balls between each set of cooperating ball races, and a retaining sleeve fitting the outer circumferential surfaces of said ball cups and having annular bulges at opposite ends overlapping the bottoms of the ball cups for holding said cups in abutting relation and thereby maintaining in assembled relation all parts of the bearing unit.

8. In a skate roll, the combination of a tread-forming disk having a central aperture therein, a sleeve fitted within said aperture, an anti-friction bearing unit fitted within said sleeve, and annular enlargements extending both outwardly and inwardly at opposite ends of said sleeve for preventing relative displacement of said disk and bearing unit.

9. In a skate roll, the combination with an annular tread-forming member, of a series of bearing balls, a central cone member providing an inner ball race for said balls, a ball-retaining device encircling said cone member and providing an outer ball race for said balls, a sleeve fitting the outer circumferential wall of said ball-retaining devices and the inner peripheral face of said tread-forming member, said sleeve having its opposite ends crimped to offset them radially both inwardly over the opposite ends of the ball-retaining device and outwardly into the material of the tread-forming member.

In testimony whereof I have affixed my signature.

ARTHUR L. STAPLES.