Feb. 17, 1953 H. F. WHITCOMB, JR 2,628,869

ROLLER-SKATE WHEEL

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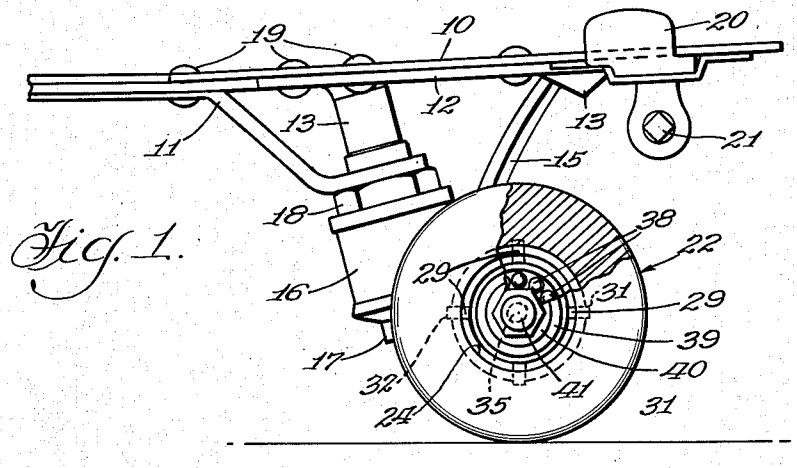

Fig. 1.

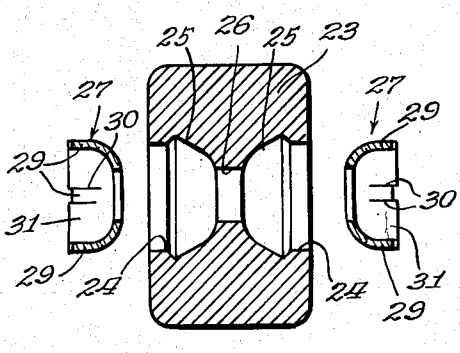

Fig. 2.

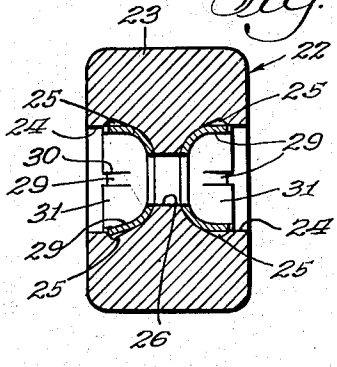

Fig. 3.

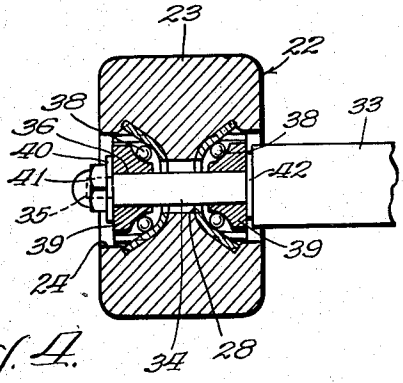

Fig. 4.

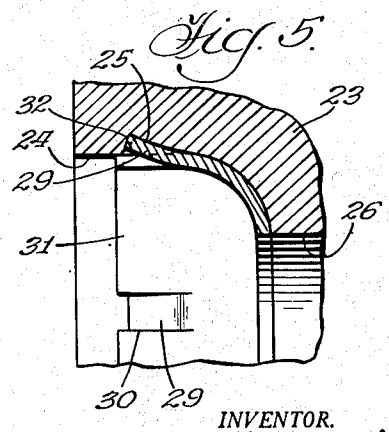

Fig. 5.

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ROLLER-SKATE WHEEL

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2 Claims. (Cl. 301—5.7)

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The present invention relates to improvements in roller skate wheels, and particularly to an improved ball bearing cup structure and its attachment to a wheel shell.

The principal object of the invention is to provide a ball bearing cup of simple construction which can be readily and conveniently applied in a cup-shaped recess formed in a wheel shell made of wood, fiber, or other suitable materials, and which, when so applied, will resist any tendency of the cup to work loose in the wheel shell, there being tangs formed on the cup which are partially embedded in the material of the wheel shell to provide a positive interlocking engagement between the bearing cup and the wheel shell, the interlocking engagement being such as to prevent both rotational and axial movements of the cup relative to the wheel shell.

The invention may be described briefly as comprising a roller skate wheel shell made of any suitable material resistant to wear, yet workable, such for example as wood, pressed fiber, and the like. In each face of the wheel shell there is formed a recess, ordinarily of hemispherical shape, having a radially enlarged axially intermediate portion in the form of a V-shaped groove. A cup member for containing anti-friction bearing elements and conforming to the shape of the recess in the wheel shell, is positioned in said recess and the relation between the depth of the cup and the distance from the axially outer edge from the V-shaped groove to the bottom of the recess is such that the outer edge of the cup extends slightly outwardly from the said outer edge of the V-shaped groove when the cup is seated in the recess. The rim portion of the cup is provided with a series of inwardly extending slits which form a plurality of tongues which normally stop short of the rim of the cup. When the cup is fitted in the said recess in the wheel shell, the tongues are pressed radially outwardly at their ends, by any suitable means, so that their ends project into the V-shaped groove. In their movement to their normal operative positions, the ends of the tongues cut or shave away some of the shell material and thus form transverse grooves in the outer face of the V-shaped groove. The tongues, because of their position relative to the groove, begin their cutting action after the cutting edges have passed beyond the edge of the groove, as shown best in Figs. 3 and 4 of the drawing. When the tongues have been moved to the positions indicated, the end edges abut the bottoms of the grooves thus formed, preventing axial movement of the cup relative to the wheel,

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and the ends of the side edges of the tongues engage the side surfaces of the transverse grooves cut in the outer face of the V-shaped groove by the outward spreading movement of the tongues and thereby provide an interlocking engagement between the cup and shell which effectively prevents relative rotational movement between the cup and shell. The cup is thus securely anchored in the wheel shell. Of course, the cup and shell are apertured or bored to accommodate an axle or the like.

A further object of the invention includes the provision of an improved method of assembling a bearing cup in a roller skate wheel shell, both elements being formed for cooperative interlocking engagement, which method includes outward bending of tongues on the cup into an enlarged recess portion in the shell, with the tongues in their movement modifying the shell by cutting away shell material to form anchoring grooves.

Other and further objects, advantages, and features of the invention will be apparent to those skilled in the art from the following description of one embodiment thereof, together with the accompanying drawings, in which:

Fig. 1 is a fragmentary side elevation of the forward part of a roller skate including a wheel formed in accordance with the invention; the wheel being shown partly in section to illustrate certain features of the invention.

Fig. 2 is an axial cross-section of a shell for a wheel such as shown in Fig. 1, with a pair of cups in position for insertion therein;

Fig. 3 is a view similar to Fig. 2, showing two cups, one partially assembled and the other completely assembled with the shell;

Fig. 4 is a view similar to Fig. 3, but showing the assembly of the completed wheel on an axle; and

Fig. 5 is an enlarged fragmentary view of a portion of Fig. 3, illustrating more clearly the engagement of the parts.

Referring to the drawings, there is shown in Fig. 1 certain conventional constructions including the front part of a roller skate, including a toe plate 10, the forward portion of a bridge 11 having its end bent downwardly, a truck socket plate 12 with a front socket 13 on the lower end of which the bridge 11 bears, and a bracket 15 which supports the front axle and has one end secured in the socket 13 and the other end extending rearwardly to support a resilient buffer 16 disposed beneath the front end of the bridge 11. A suitable bolt 17 extends through the rear end of the bracket 15, buffer 16, and front end

of the bridge 11, and is threadedly secured in the socket 14 to hold the parts in assembly. A nut 18 may be threaded on the bolt below the bridge 11 to hold the latter firmly against the socket 14, regardless of the action of the buffer 16. Rivets 19 or the like may be employed to secure the bridge 11 and socket plate 12 to the toe plate 10. The usual clamping element 20 is provided for securing the skate to the skater's shoe, and is operated by the usual screw 21 having a squared end for cooperation with a conventional skate key. The construction as so far described is more or less conventional, and may be varied as desired without affecting the invention.

The present invention is directed to constructions embodied in the skate wheels, one of which is indicated generally at 22. The body of the wheel, or shell 23, may be of any suitable material which may be readily worked, wood and fibrous materials being most commonly employed, although other materials having the desired properties may be used. The shell 23 is formed in each side face with a cup-shaped recess 24 in each face, which recess is circular and centered on the shell axis, and is enlarged at a portion intermediate its axially inner and outer ends. The enlarged portion 25 may be in the form of an annular groove preferably of general V-shape which opens into the main portion of the recess, as shown. A bore 26 extends through the shell 23 between the said cup-shaped recesses to accommodate the axle.

A bearing cup 27 is provided for insertion in each recess 24 and is of a shape conforming generally to the recess 24, in this case generally hemispherical. The cup may be of any suitable material, although hardened steel is preferable since the cup provides one bearing surface for a series of antifriction ball bearing elements 38. Although the cup conforms generally to the shape of the recess, it is of less depth. Specifically, the depth of the cup 27 is slightly greater than the axial distance from the axially outer edge of the enlarged recess portion 25 to the bottom of the recess, or in other words to the adjacent end of the bore 26. The bottom of the cup is provided with an aperture 28 to accommodate the wheel axle. A series of tongues 29 are formed by slitting the rim portion of the cup 27 at spaced locations as indicated at 30, so that the slits which extend from the cup rim toward its bottom terminate at an intermediate location.

In assembling the cups and shell, the cups are first seated in the recesses 24, the ends of the tongues 29 and wall portions 31 projecting slightly outwardly beyond the enlarged recess portions 25, by reason of the depth relationship previously explained. This is best shown by the upper portion at the left-hand cup of Fig. 3. After a cup 27 has been seated in its recess, the tongues 29 are forced radially outwardly, by any suitable means, toward the inner side face of the enlarged recess portion 25. Obviously, since the ends of the tongues when bent outwardly engage one inclined wall of the recess 25, they must cut or shave away the material of the shell 23 in their movement to their final locking positions and thus form grooves 32 whose axes lie in planes which pass substantially through the wheel axis. In Fig. 3, one tongue 29, at the lower portion of the left-hand cup, is shown as partly bent to its final position, with its end cutting through the shell material toward the axis of the groove 25. In such position, the tongues accomplish, at least theoretically, the interlocking engagement contemplated, but for the purpose of rigidity, I prefer to bend the said tongues into engagement with the bottom of the groove. In the final position of the tongues, they lie against the axially inner surface of the enlarged portion 25 of the recess, or substantially so, and their ends are engaged in the grooves 32 which they have cut as described. As will be clear particularly by reference to Figs. 1 and 5, the end edges of the tongues 29 abut the bottoms of the grooves 32 adjacent the inner face of the recess portion 25, and thus prevent the cup 27 and shell 23 from moving axially relative to each other. The end portions of the side edges of the tongues engage the sides of the grooves 32, and thus prevent relative rotational movement of the shell and cup. The engagement of the cup wall portions 31 against the surface of the recess and the general conformity of the cup to the recess, of course prevent relative radial movement of the cup and shell. The cup 29 is thus positively and securely anchored in the shell 23, and developement of looseness and play between these parts is prevented even under the stress of hard usage.

Bearing cups previously employed have been formed with rigid wedge-like projections which extend outwardly from the cup and intended to anchor the cup in its seated position in the shell, but since such projections are of wedge shape and gouged the shell material as the cup is moved axially into the recess, there was no solid uncut material against which they can abut to prevent the cup moving axially outwardly. Again, since such projections were relatively small and sharp, they rather readily cut into the shell material under relative rotational stress, forming paths in which they could move to permit rotational play between the cup and shell. The cost of forming and assembling the shell and cup in accordance with the present invention is not appreciably greater than with the prior constructions, and eliminates the disadvantage of looseness which often required discarding and replacement of wheels long before they were worn out.

In Fig. 4 is illustrated the mounting of the wheel 22 on an axle. The axle 33 of the skate has a reduced portion 34 and a further reduced and threaded end portion 35. The axle portions 34 and 35 are flattened at 36 and 37, respectively, as best shown in Fig. 6. Ball bearings 38 are retained between each cup and a suitable bearing zone 39. The cone is arranged therein so that the bearings roll between the cup and the cone in the usual manner. A reduced portion 34 of the axle extends through the cones 39, the apertures 28 of the cups, and the bore 26 of the shell. A washer 40 is disposed on the reduced end 35 of the axle and held against the outer cone 39. It will be understood that the shoulder between the axle portions 34 and 35 limits the pressure which may be applied to the various bearing elements by means of the nut 41. A suitable washer 42 may be interposed between the axially inner cone 39 and the shoulder between the reduced portion 34 of the axle and the main part of the axle 33. The cones and washers are formed to engage the flattened portions 36 and 37 of the axle portions 34 and 35 to be held thereby against rotation with the shell. Of course, other conventional means might be employed to accomplish the same purpose. Similarly, the particular bearing elements and mounting means for the wheel 22 may vary from those illustrated without affecting the invention.

I claim:

1. A wheel comprising a non-metallic body of material suitable for work-cutting, said body having a cup-shaped recess disposed coaxially of said wheel, the wall of said recess intermediate its ends having formed therein an annular V-shaped groove the bottom of which is of greater diameter than said recess to provide an axially outer face sloping axially outwardly from the bottom of said groove to the wall of said recess, said face having a groove formed therein, and a metallic bearing cup seated in said recess with its outer end positioned axially outwardly of said face, a pair of spaced slits extending axially inwardly from the rim of said cup, the metal between said slits being bent radially outwardly of said cup to form a tongue positioned in said second groove, the outer end of said tongue being tightly seated within said second groove to prevent relative rotational movement between said cup and said body.

2. A wheel comprising a non-metallic body of material suitable for work-cutting, said body having a cup-shaped recess disposed coaxially of said wheel, the wall of said recess intermediate its ends having formed therein an annular V-shaped groove the bottom of which is of greater diameter than said recess to provide an axially outer face sloping axially outwardly from the bottom of said groove to the wall of said recess, and a metallic bearing cup having a rim, said cup being seated in said recess with its outer end positioned axially outwardly of said face, a pair of spaced slits extending axially inwardly from the rim of said cup, the metal between said slits being bent in place radially outwardly of said cup to form a tongue, the outer end of said tongue digging into the surface of said face to form an interlock to prevent relative rotational movement between said cup and said body.

HENRY F. WHITCOMB, JR.

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