Oct. 2, 1934. E. R. POWELL 1,975,661

DISK WHEEL FOR ROLLER SKATES

Filed March 11, 1932

Fig. 2.

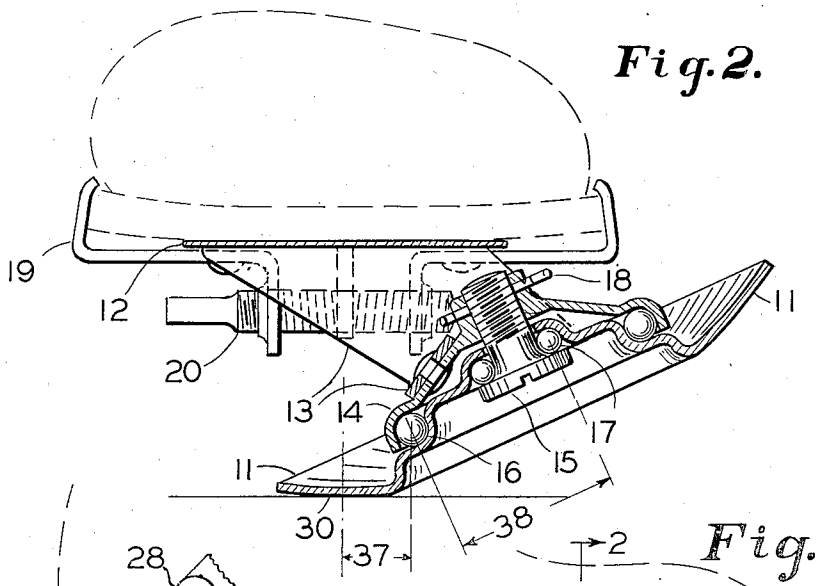


Fig. 1.

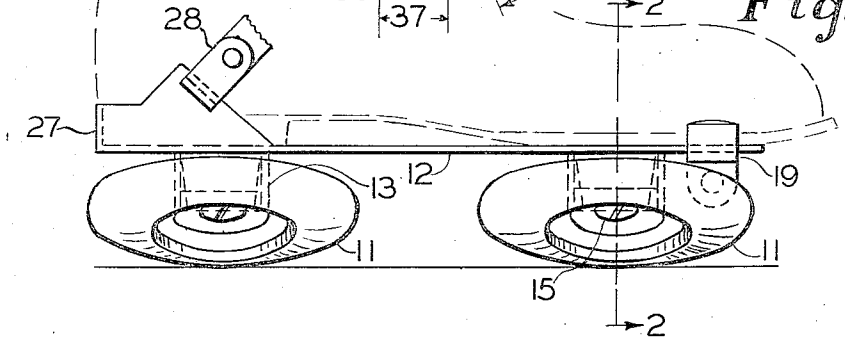


Fig. 3.

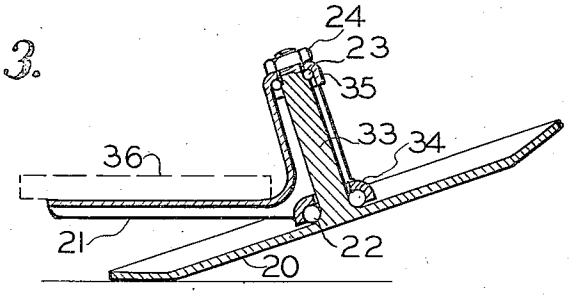
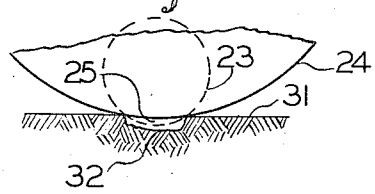


Fig. 4.



INVENTOR.

Edward R. Powell.

Patented Oct. 2, 1934 1,975,661

UNITED STATES PATENT OFFICE

1,975,661

DISK WHEEL FOR ROLLER SKATES

Edward R. Powell, Alexandria, Ind.

Application March 11, 1932, Serial No. 598,221

13 Claims. (Cl. 208—181)

This invention relates to a disk wheel and mounting therefor suitable for roller skates and the like.

It relates particularly to a disk wheel so disposed as to permit its use on relatively rough surfaces such as concrete and asphalt side walks without excessive road friction and vibration. While roller skates have been in use for many years, their value has been generally limited to conditions where the floors are specially suitable for them. Their merit on side walks is greatly limited by the shock of the small wheels encountering the irregularities of the side walk surface. Numerous designs have been proposed for using larger wheels but these have been generally unsatisfactory. They have raised the foot too far from the ground or have provided support in unnatural places or have been too cumbersome. The advantages of this invention are that it provides a large-diametered disk-like wheel which operates in a small clearance, gives a light, compact but resilient structure and a rolling action equivalent to a wheel of comparatively large diameter.

The object of the invention is, then, to provide a disk wheel which embodies these advantages and is economical to manufacture and is suitable for general use on reasonably smooth side walks, or other hard substantially horizontal surface.

The full nature of the invention will be understood readily from the accompanying drawing and the following description and claims:

Fig. 1 is a side elevation of two disk wheels as applied to a roller skate.

Fig. 2 is an enlarged section taken in plane 2—2 of Fig. 1 and in the direction of the arrows.

Fig. 3 is a sectional view similar to Fig. 2 and of a part of a wheel and mounting therefor.

Fig. 4 is a diagrammatic illustration of a large radius wheel of the invention applied to a surface crack, dotted lines indicating a standard roller skate wheel associated therewith.

A complete structure which embodies the invention is shown in Figs. 1 and 2. The skate is provided with two obliquely disposed disk wheels 11, each of which supports the foot plate 12 by means of brackets 13, cups 14, ball races 16 and 17 and screw-bolts 15. The foot plate is provided with clamps 19, clamp screw 20, heel stop 27 and strap 28. The position of the shoe is shown in dotted lines. The pin 18 holds the screw-bolt 15 in proper adjustment for clearances for both ball races.

The disk 11 is supported by the ball races and rotates freely in response to any forward or backward thrust on the device. The plane of rotation of the disk is shown at about 23 degrees with the ground and the foot plate. The disk 11 consists preferably of a single piece of pressed steel manufactured from sheet or strip steel and is preferably case hardened to lower the friction of the balls and provide additional stiffness and longer wear.

To avoid any considerable multiplication of the load stresses on the bearings, the amount of the overhang (distance 37) is made small compared with the resistance leverage (distance 38) of the bearings. The annular portion 11, the space defined by dimension 37 and the surface 30 in Fig. 2 constitute the overhung tread portion as used in the claims. In the present form of the device, the average overhang is less than the resistance leverage. The design of bearings is such that the wheel is held rigidly in a definite plane of rotation and will rotate freely even when subjected to an overhung load.

The structure illustrated in Figs. 1 and 2 employs a wheel of about 4¼ inches in diameter so disposed as to have an arc of contact with the ground equal to about a nine inch diameter vertical wheel. With the aforesaid mounting of the wheels, the foot plate is positioned about 1⅞ inches above the ground or supporting surface. The disk 11 has a tread portion 30 which is slightly crowned to minimize sliding action in contacting the floor and give the foot freedom of motion but keeps the support well under the center of the foot, see Fig. 2. The slightly overhung arrangement gives resiliency to the structure and eliminates the necessity for springs or cushions. The cup 14 and screw 15 are preferably hardened where they contact the balls. The bracket 13 is riveted or spot welded to plate 12 and to cup 14.

The advantage of this invention can be seen more clearly by reference to Fig. 4. The surface 31 has a depression, crack or groove 32. A roller skate wheel of conventional size is indicated by dotted circle 23. The relative arc of contact which may be obtained by the use of this invention is indicated by line 24. The difference in the amount of deflection from the level of surface 31 is shown at 25. This deflection governs the amount of shock and road friction.

The modified form of structure shown in Fig. 3 includes a disk 20 which has a shaft portion 33. The shaft is rotatably supported by ball races 22 and 23 and is held in place by nut 24. The ball races are carried by bracket 21 which has cup-shaped portions 34 and 35. The bracket supports

plate 36. This device is intended to move easily within a relatively small clearance and not only may be included in a skate but in other devices such as a crawler (used in garages) or a scooter (used as a toy).

The foregoing examples of application are merely illustrative of the invention and should not be taken in a limiting sense. In general, the invention includes an obliquely disposed wheel used so as to increase its effective arc of contact with the surface on which it rolls but obtaining therewith low ground clearance. Ball bearings are shown but any anti-friction bearings which maintain the alignment of the wheel and will carry an overhung load will serve.

The plate 12 and brackets 13 are merely load-carrying members and, of course permit of wide variation in their design.

The invention claimed is:

1. A wheel adapted to roll on a surface, load carrying members associated therewith, bearing means contacting the wheel and supporting the load carrying members, the bearing means holding the wheel rotatably at an angle of less than 45 degrees with the surface on which it rolls.

2. A load carrying member, bearings carried in spaced relation thereto, a wheel rotatably supported on said bearings and adapted to roll on a surface, the wheel having a tread portion adapted to contact the surface normally at an angle of less than 45 degrees with the plane of rotation of the wheel.

3. A wheel adapted to roll on a surface, bearing means contacting said wheel, foot-supporting members carried from said bearings, the bearings being characterized by anti-friction elements and being adapted to support the wheel normally at an angle of less than 45 degrees with the surface on which it rolls.

4. A wheel adapted to roll on a surface, bearings contacting the wheel, load carrying members supported from said bearings, the bearings being characterized by relatively frictionless resistance to change in the plane of rotation of the wheel, and being adapted to support the wheel rotatably at an angle of less than 45 degrees with the surface on which it rolls.

5. A wheel mounted on anti-friction bearing means and adapted to rotate at an angle of less than 45 degrees with the horizontal, to roll on a substantially horizontal surface, to contact the surface in a tread portion slightly crowned and tangent to the surface at an angle of less than 45 degrees with the plane of rotation of the wheel.

6. A device of the class described which comprises a wheel, bearings therefor, a substantially horizontal plate carried on said bearings adapted to support a load, said wheel being disposed at an angle of less than 45 degrees with the plate.

7. A device of the class described which comprises a wheel, bearings therefor, a normally horizontal plate-like member adapted to carry a load, the wheel being rotatable in a plane at less than 45 degrees with the plate and having a tread portion adapted to contact a substantially horizontal surface.

8. A disk-wheel skate which includes a wheel, bearings therefor, a normally horizontally disposed plate-like member, the wheel being rotatable in a plane of less than 45 degrees with the plate-like member and having a tread portion in over-hung relation to the bearings, the bearings having relatively large and frictionless resistance to change in plane of rotation of said wheel.

9. A disk-wheel device for a skate including a foot supporting member, a wheel located mainly below said member and supported in a plane oblique to that of said member, the wheel having a crowned tread portion and being substantially greater in diameter than the distance from said tread portion to said member.

10. A disk wheel device for a skate including an obliquely disposed wheel of substantially pressed sheet formation, said wheel having an overhung tread portion adapted to contact the ground formed in the side thereof and being adapted to coact with a plurality of rolling anti-friction elements which are adapted to maintain its alignment.

11. An obliquely disposed wheel device for a skate including a wheel of substantially unitary pressed sheet formation, said wheel being adapted to contact the ground on one lateral surface thereof and adapted to coact with rolling anti-friction elements on the opposite lateral surface thereof.

12. An obliquely disposed wheel device for a skate including a wheel of substantially pressed sheet formation, said wheel having a tread portion formed on one lateral surface thereof, and a load transmitting opposite lateral surface.

13. An obliquely disposed wheel device including a wheel of substantially pressed sheet formation, the wheel having an overhung tread portion formed in one side surface thereof, the wheel being supported on bearings, the amount of the average overhang, being less than the resistance leverage of the bearings.

EDWARD R. POWELL.