

Aug. 15, 1961

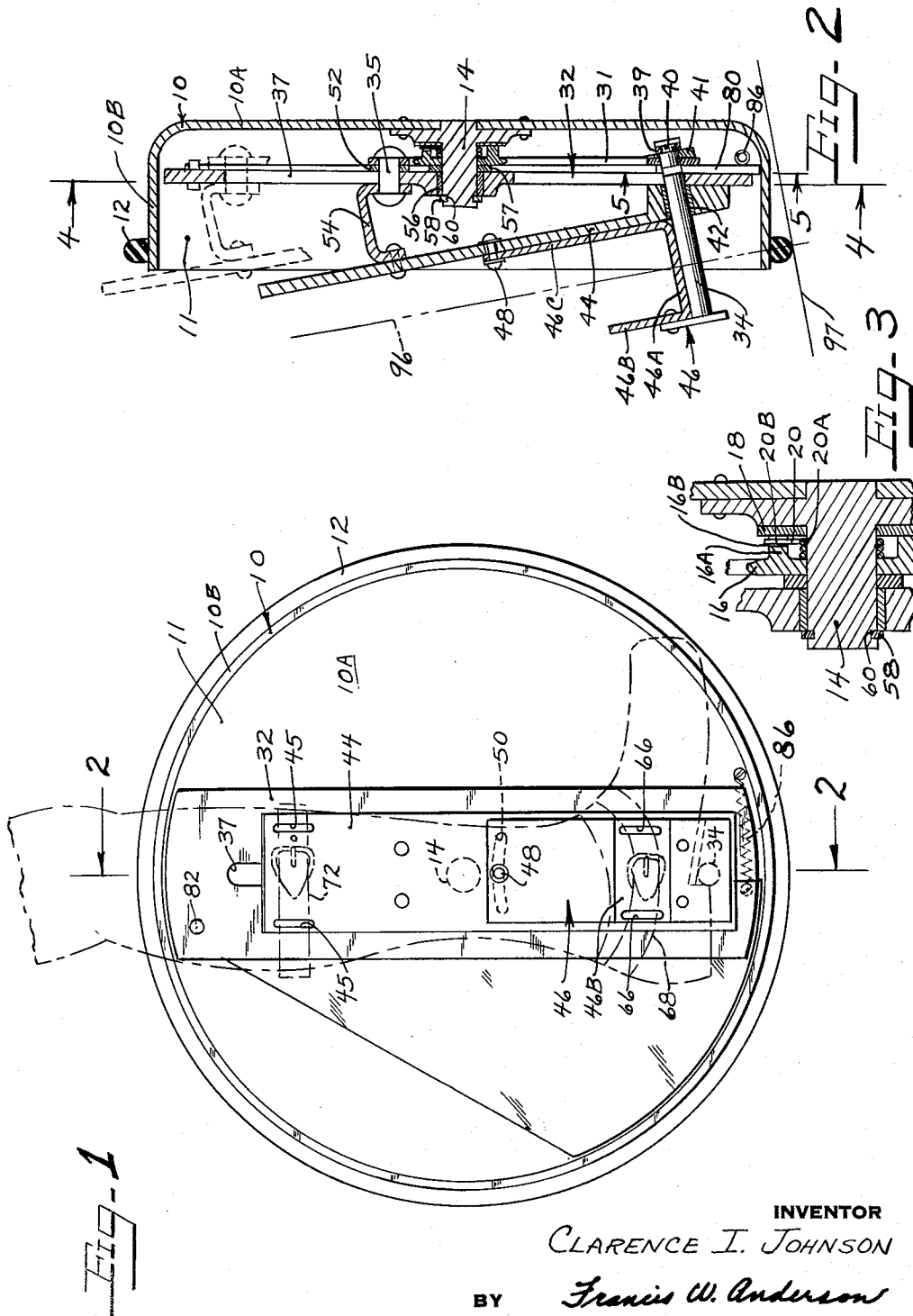
C. I. JOHNSON

2,996,306

ROLLER SKATE PROVIDED WITH PROPULSION MEANS

Filed June 17, 1958

2 Sheets-Sheet 1



INVENTOR

CLARENCE I. JOHNSON

BY

Francis W. Anderson

ATTORNEY

Aug. 15, 1961

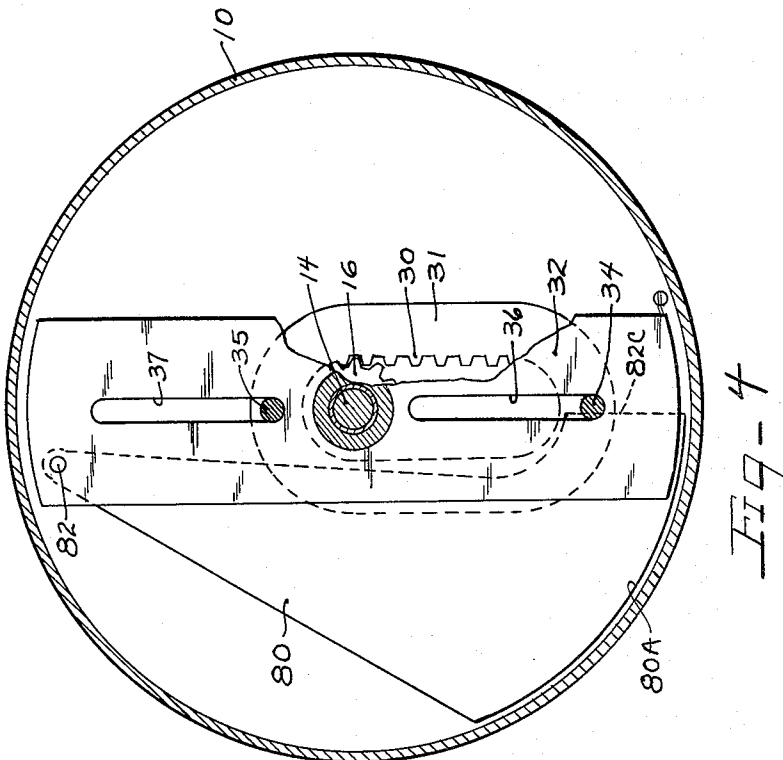
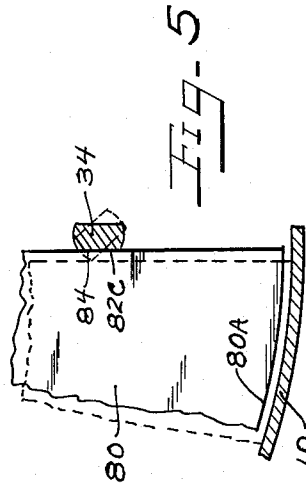
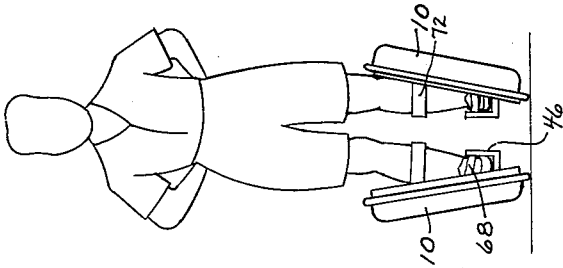
C. I. JOHNSON

2,996,306

ROLLER SKATE PROVIDED WITH PROPULSION MEANS

Filed June 17, 1958

2 Sheets-Sheet 2



INVENTOR

CLARENCE I. JOHNSON

BY

Francis W. Anderson

ATTORNEY

1

2,996,306

ROLLER SKATE PROVIDED WITH PROPULSION MEANS

Clarence I. Johnson, 1795 Willowhurst Ave.,
San Jose, Calif.

Filed June 17, 1958, Ser. No. 742,622

7 Claims. (Cl. 280-11.11)

This invention relates to wheeled conveyances of the same general class as roller skates on which the wearer is carried from one place to another for business or pleasure. More particularly, this invention relates to wheeled conveyances wherein the shifting of the weight of the wearer from one foot to the other is employed to furnish motive power for the conveyance.

Wheeled conveyances of this particular type have been proposed heretofore. However, these devices have been generally unsatisfactory due to the fact that the mechanisms used for converting the downward thrust of the wearer's foot to a turning moment at the wheel of the conveyance have been extremely complicated or inefficient.

An object of the present invention is to provide an improved wheeled conveyance.

Another object is to provide a one-wheeled conveyance that is stable in operation.

Another object is to provide an improved mechanism for converting the downward thrust of the wearer's foot to a turning movement of the wheel.

Another object is to provide an improved means for securing a wheel to the wearer's leg and foot.

Another object is to provide an improved brake and brake-actuating mechanism for a wheeled conveyance.

Another object is to provide an improved clutch for a wheeled conveyance.

Other and further objects, features and advantages will be apparent to one skilled in the art from the following detailed description, taken in connection with the accompanying drawings, in which:

FIGURE 1 is a side elevation of a wheeled conveyance constructed in accordance with the teaching of the present invention.

FIGURE 2 is a section taken on line 2-2 of FIG. 1.

FIGURE 3 is an enlarged view of a portion of FIG. 2.

FIGURE 4 is a section taken on line 4-4 of FIG. 2.

FIGURE 5 is an enlarged fragmentary section taken on line 5-5 of FIG. 2.

FIGURE 6 is a more or less schematic showing of a child wearing two of the wheeled conveyances of the present invention.

In FIGURES 1 and 2 the reference numeral 10 indicates a drum-like wheel or roller having a disk-like body portion 10A and an intumed peripheral flange 10B which encloses a mounting chamber 11. A ground-contacting rubber tire 12 is secured around the outer surface of the flange 10B in any suitable manner. A central shaft 14 is secured to the wheel, as by rivets, and projects inwardly thereof into the chamber 11. A gear 16 (FIG. 3), which is rotatably journaled on the shaft 14, has a hub 16A, bearing against a brass thrust washer 18. The gear 16 is operatively connected to the shaft 14 through a one-way clutch in the form of a spring 20 which has a body portion 20A coiled around the shaft 14 and a radially-outwardly projecting end portion 20B disposed in a radial slot 16B (FIG. 3) provided in the gear hub 16A. The arrangement is such that, when the gear 16 is rotated in one direction, the spring is wound tightly around the shaft in driving engagement therewith. When

2

the gear is rotated in the opposite direction, the spring is loosened on the shaft and the driving connection is broken.

The gear 16 is rotated by means of a rack 30 (FIG. 4), the teeth of which mesh with gear 16 and are formed on a loop member 31 that lies flat against a guide plate 32 and carries two power-transmitting rods 34 and 35 that are disposed in vertical guide slots 36 and 37, respectively, in the guide plate. The lower power-transmitting rod 34 (FIG. 2) is secured to the loop member 32 by a spring clip 39 which is disposed in a groove 40 in one end of the rod 34 and bears against a slanted washer 41. This lower rod is rotatably journaled in a bearing 42 of a leg-support plate 44 and is secured as by welding to a base member 46A of a foot-receiving stirrup 46. The stirrup 46 has an outer, upwardly projecting strap portion 46B and an inner upwardly projecting strap portion 46C that lies close against the leg-support plate 44 and carries, at its upper end, a pin 48 that is disposed in a curved slot 50 (FIG. 1) in the support plate.

The upper power-transmitting rod 35 is in the form of a heavy rivet that extends through the loop member 32, a spacer washer 52, the upper guide slot 37, and through a strap 54 that is riveted to the leg support plate 44.

As best seen in FIG. 2, the guide plate 32 is provided with a bronze bushing 56 which receives the wheel shaft 14, and a brass washer 57 is disposed between the guide plate 32 and the gear 16. A spring clip 58 is disposed in a groove 60 in the inner end of the shaft 14 to lock the members in assembled relation.

The outer strap portion 46B of the stirrup has slots 66 (FIG. 1) adapted to receive a strap 68 (shown in phantom lines) which is used to secure the wearer's foot to the stirrup. Similarly, the leg-support plate 44 has slots 45 (FIG. 1) adapted to receive a strap 72 for securing the leg of the wearer to the plate.

In FIG. 6 a boy is shown equipped with two of the wheeled conveyances of the present invention. It will be evident that, when the boy raises one of his legs, the power-transmitting rods 34 and 35 and the rack 30 will be carried upwardly, causing the gear 16 to be rotated in a first direction. The one-way clutch is so arranged that, when the gear is rotated due to upward movement of the rack, the shaft will not be driven. When the power transmitting rods are at the top of the guide grooves, the boy pushes downwardly, causing the gear to be rotated in the opposite direction. The clutch immediately grips the wheel shaft and rotates it, causing the boy to be carried forwardly. It will be evident that the distance traveled during one downward pumping stroke will depend upon how many revolutions the gear 16 makes and also upon the effective outer diameter of the wheel. It is desirable that the rack and gear device be so coordinated with the length of the guide slots 36 and 37 that one pumping stroke will cause one rotation of the gear 16 and one revolution of the wheel 10. One satisfactory arrangement consists of a wheel with a diameter, measured at the tire 12, of 20 inches, and a guide plate with grooves 6 inches long so that, for each pumping stroke, the boy is carried forwardly approximately five feet.

A brake mechanism is provided in the form of a brake shoe 80 (FIG. 4) that is mounted at its upper end by a suitable pivot pin 82. At its lower end, the brake shoe has a cylindrical wheel-contacting edge 80A. As seen in FIGS. 2 and 4, the lower end portion of the brake shoe 80 lies between the guide plate 32 and the rack loop 31. An edge 82C (FIG. 5) of the shoe is held against a flattened portion 84 of the lower power-transmitting rod 34

3

by a spring 86 (FIG. 1) which is connected to the brake shoe and to the inner surface of the wheel 10. To apply the brake, the boy drops his heel downwardly causing the rod 34 to rotate counterclockwise (FIG. 1). As best seen in FIG. 5, this counterclockwise rotation forces the brake shoe 80 to the dotted line position wherein the shoe frictionally grips the inner surface of the wheel to stop its rotation.

It will be noted in FIGURES 2 and 6 that the wheel 10 of each wheeled conveyance of the present invention is disposed at an angle relative to the vertical, when it is in operation. In FIG. 2, the reference line 96 indicates the approximate line of application of the wearer's weight, and it is evident that this line is substantially normal to the ground, indicated by reference line 97. The inclined position of the conveyance permits it to be mounted alongside the wearer's foot and leg in a position which affords maximum stability. In this connection it should be noted that, even when the power-transmitting rods are in their uppermost positions at the top of the guide slots 36 and 37, the wearer's foot is still lower than the axis of shaft 14. This arrangement, wherein the foot is always below the axis of rotation of the wheel to which it is operatively connected, makes the device particularly stable.

It is also to be noted that, since each conveyance has only one wheel surface in contact with the ground, the conveyance can be readily turned, to change the direction of movement of the operator, merely by pivoting the wheel laterally, using the point of contact with the ground as the pivot point. Thus a change of direction may be accomplished without lifting the wheel from the ground, as is necessary when the conveyance has more than one ground-contacting wheel.

A particular advantage of the invention resides in the use of an articulated attachment arrangement wherein the wearer's leg is strapped to the support plate 44 while the foot is strapped to the stirrup 46 which is pivotally movable relative to the support plate. Thus, the wheel is maintained under the positive control of the leg while the brake is applied by a swinging movement of the foot.

While I have shown one embodiment of my invention, it will be evident that some variations may be made without departing from the novel concepts of the invention. Accordingly, it will be understood that the invention is limited only by the scope and proper interpretation of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A wheeled conveyance comprising a wheel having a disk-like body and an inturned peripheral flange defining a mounting chamber, a shaft secured to said body and projecting into said chamber, a guide plate freely rotatable on said shaft and disposed in said chamber, said plate having at least one vertical guide slot, an actuating member having a portion disposed in guided relation in said slot and mounted in said chamber for reciprocating movement in a generally vertical plane, a one-way clutch operatively connecting said actuating member and said shaft so that downward movement of said actuating member will cause rotation of said shaft, and foot and leg attachment means mounted alongside said wheel and connected to said actuating member and arranged to orient the wheel in inclined position relative to and alongside the wearer's leg.

2. A wheeled conveyance comprising a shaft, a wheel secured to said shaft for rotation therewith, a gear rotatable on said shaft, a one-way clutch operatively connected between said gear and said shaft, a guide plate supported on said shaft and having upper and lower vertical guide slots disposed above and below said shaft respectively, upper and lower power-transmitting rods projecting through said upper and lower guide slots respectively, a rack secured to both of said rods and in mesh with said gear, a leg attaching member connected to said upper power-transmitting rod, a foot support member

4

connected to said lower power-transmitting rod, and means pivotally connecting said foot support member to said leg attaching member.

3. A wheeled conveyance comprising a shaft, a wheel secured to said shaft for rotation therewith, means providing an axially projecting inturned peripheral flange on said wheel, a gear rotatable on said shaft, a one-way clutch operatively connecting said gear and said shaft, a guide plate supported on said shaft and having upper and lower vertical guide slots disposed above and below said shaft respectively, upper and lower power-transmitting rods projecting through said upper and lower guide rods respectively, a rack secured to both of said rods and in mesh with said gear, a leg attaching member connected to said upper power-transmitting rod, a foot support member connected to said lower power-transmitting rod, means pivotally connecting said foot support member to said leg attaching member, and a brake plate pivoted on said guide plate and having a portion disposed in guided relation between said guide plate and said rack, and having a portion adapted to be moved into frictional contact with said inturned flange, said lower power-transmitting rod having a flattened portion in abutting contact with said brake plate, whereby rotation of said lower rod causes pivoting of said brake plate and movement of said plate into braking engagement with said flange.

4. In a wheeled conveyance, a shaft, a wheel connected to said shaft for rotation therewith, said wheel having a disk-like body portion and an inturned peripheral flange defining a mounting chamber, said shaft being secured to said wheel and projecting into said chamber, a gear operatively connected to said shaft, a guide plate mounted in said chamber in the plane of said wheel and having a slot therein, a rack disposed within said chamber adjacent said guide plate and in mesh with said gear, a reciprocable drive member connected to said rack, and means carried by said drive member and projecting into the slot of said guide plate to guide the movement of said drive member.

5. In a wheeled conveyance, a wheel having an inturned peripheral flange defining a mounting chamber, a shaft secured to said wheel and projecting into said chamber, a gear operatively connected to said shaft within said chamber, a reciprocable leg attachment inclined relative to the plane of said wheel and mounted on the open side of said chamber for movement in a plane parallel to the plane of said wheel, a rack mounted within said chamber and operatively connected to said gear, and means connecting said reciprocable leg attachment to said rack, whereby movement of said leg attachment in one direction along the open side of said chamber causes rotation of said gear in said chamber.

6. In a wheeled conveyance, a wheel having a disk-like body portion, a drive shaft connected to said disk-like body portion, a guide plate rotatable on said shaft and disposed in the plane of said wheel, means defining a guide slot in said guide plate, a power transmitting member disposed between said body portion and said guide plate, means connecting said member in driving engagement with said shaft, a leg attachment member mounted for reciprocating movement on the opposite side of said plate from said power transmitting member, and means extending through said slot and connecting said leg attachment and said power transmitting member for unitary movement.

7. A wheeled conveyance comprising a shaft, a wheel secured to said shaft for rotation therewith, a gear rotatable on said shaft, a one-way clutch operatively connected between said gear and said shaft, a guide plate supported on said shaft and having upper and lower guide slots disposed above and below said shaft respectively, upper and lower guide rods projecting through said upper and lower guide slots respectively, a rack mounted for movement with both of said rods and in mesh with said gear, a leg attaching member mounted for movement alongside said guide plate, a foot support member below said leg attach-

ing member, and means connecting both said leg attaching member and said foot support member for movement with said rods.

References Cited in the file of this patent

UNITED STATES PATENTS

591,925	Kimbrough	Oct. 19, 1897
873,889	Palmer	Dec. 17, 1907
1,437,314	Jorgensen	Nov. 28, 1922
1,761,807	Van Eppen	June 3, 1930
1,861,584	Readecker et al.	June 7, 1932

5

572,826
130,806
313,449
4,752
of 1903
108,913

10

Padgett	Aug. 2, 1932
Blackwell	Aug. 29, 1950

FOREIGN PATENTS

France	Feb. 28, 1924
Germany	May 29, 1902
Germany	July 14, 1919
Great Britain	Apr. 23, 1903
Great Britain	Aug. 30, 1917