

IMPROVED CASTER

This invention relates to a caster assembly.

A known construction of caster assembly is shown in Figure 1, wherein a caster 50 includes a wheel 56 having a central gear portion 54 integrally formed around the outer casing of a caster shaft 55, a support 51 with an open section at its lower portion installed over the wheel 56, a brake or latch mechanism provided with an operating arm 52 and a check pin 53 disposed in the support 51 with the operating arm 52 extending out of the open section. When the operating arm 52 is pressed inward from the upper end thereof, the check pin 53 will be lowered down and engaged in one of the tooth spaces of the gear portion 54 (as the dotted line shows in Figure 1) for effecting brake operation. Deficiencies of this known caster are as follows:

1) During braking, the operating arm has no way to maintain itself in the braking position. Consequently, the braking applied by the operating arm can be released through a vibration or any other movement of the caster, resulting in the elimination of the braking effect; and

2) The reaction to the applied braking force is completely taken by both the check pin and the gear portion. As the lever force of the check pin and the gear tooth is small while the power of braking is great, the rate of wear and tear on the operating arm, the check pin and the gear tooth is relatively high.

The invention therefore seeks to provide an improved caster assembly which can overcome, or at least mitigate the problems described.

According to the present invention, there is provided a caster wheel assembly which comprises an open sided support casing, a bearing provided on the casing, a wheel rotatably mounted on the casing alongside the open side

thereof, the wheel being open along one side which faces the open side of the casing, a blind shaft hole provided on the wheel, a shaft mounted in said bearing and said blind hole in order rotatably to mount the wheel on the support casing, latching teeth provided internally of the wheel, a latching device arranged in the casing for movement between a wheel-latching position of engagement with a portion of the latching teeth and a wheel-release position, and an operating device coupled with the latching device and arranged externally of the casing, the operating device being pivotable in order to effect movement of the latching device between its wheel-latching position and its wheel-release position;

in which:

the latching device is provided with a latching element which extends through the open side of the casing and into the wheel, the latching element being movable into latching engagement with a portion of the latching teeth when the latching device is moved to the latching position thereby to prevent rotation of the wheel and to transmit any reaction force to the casing via the mounting of the latching device on the casing; and

a spring arrangement is mounted in the casing and engages with the latching device in such a way as to apply biasing which tends to maintain the device in either its release position or its latching position, following movement of the device against the spring biasing from one position to the other, whereby the latching element is resiliently biased to maintain its latching engagement with the teeth of the wheel against accidental release.

The invention will now be described in detail with reference to the accompanying drawings, in which:

Figure 1 is a plan view illustrating the general structure of known caster assembly;

Figure 2 is a three-dimensional view of a preferred

embodiment of an improved caster assembly according to this invention;

Figure 3 is a perspective and exploded view of the preferred embodiment of Figure 2;

5 Figures 4 and 5 are illustrative views indicating the braking and releasing conditions of the preferred embodiment of Figure 2; and,

Figure 6 is a plan view of a modified embodiment of the caster assembly according to this invention.

10 Referring to Figure 2, there is shown a preferred embodiment of a caster assembly according to this invention, which comprises an open sided caster support casing 10, a spring member 20 installed in the casing 10, a brake or latch device 30 pivotally mounted in the casing
15 and biased by the spring member 20 to either of a wheel-release position (as shown) or a wheel-latching position, and an internally-toothed wheel 40 rotatably mounted on the casing 10 alongside the open side thereof.

Detailed structure of the preferred embodiment is
20 shown in Figure 3 wherein the casing support 10 integrally formed in an open casing structure includes: a bearing and a shaft hole 11 in the lower portion; a blind axle hole 13 vertically formed in the left side; a positioning pin 12 provided in the outer wall defining the axle hole 13; an
25 anchor plate 14 having an indentation 141 at the lower part fixedly provided in an upright position on the top surface of the bearing and the shaft hole 11; a staggered toothed portion having a narrow tooth space 15 and a longer tooth space 16 respectively formed on the upper inner edge; a
30 rabbet or groove 17 in the curved surface at the right hand side of the casing 10; and an undulating portion 18 on the front edge adjacent the rabbet 17 with a pair of pin holes 181 opposingly located in the lower protrusion and a notch 182 in the upper indentation thereof. The spring member 20
35 is formed in a fork shape with a closed end 201 located in

the indentation 141 of the anchor plate 14 and an open section engaged in the staggered toothed portion by securing one end 202 in the tooth space 15 and leaving the other end 203 free in the tooth space 16 of the support casing 10. The latching device 30 includes an anchoring member 31 which forms an operating device for the latching device proper, and which is arranged externally of the casing and is pivotable in order to effect movement of the latching device between the wheel-release position and the wheel-latching position. The member 31 has a curved operating surface 310 on the front side, and a projecting part at the rear side with a pair of pin holes 311 and 312 separately formed therein is movably inserted in the rabbet 17 and pivotally mounted on the portion 18 of the support casing 10 by a lever pin 32 taken through the aligned pin holes 181 and 311 with the projecting part being kept in sliding contact with the free end 203 of the spring member 20 within the tooth space 16. A latching element in the form of a check pin 33 is fixed in the pin hole 312 of the anchoring member 31 with both ends transversely extending out of the open sides of the support casing 10, and one side into the wheel 40. The internally-toothed wheel 40 comprises a wheel body 41 having one side closed and the other side open, a toothed portion 42 integrally formed along the inner wall of the wheel body 41 to form latching teeth, a blind shaft hole 43 provided in the middle, and a shaft 44 rotatably mounting the wheel body 41 on the left side of the support casing 10 respectively through the shaft holes 11 and 43 thereof as shown in Figure 2.

The latching operation of the preferred embodiment is shown in Figures 4 and 5. When the anchoring member 31 is pressed inward at the lower part of the operating surface 310, the projecting part of the anchoring member 31 along with the check pin 33 will be moved upward against spring biasing action as it engages the free end 203 of the spring

member 20 and is maintained in the latching position with one end of the check pin 33 retained in the notch 182 of the portion 18 and the other end firmly engaged in the tooth space 42 of the wheel 40 through the expansion force of the spring member 20. Therefore, the wheel 40 is securely retained in the latching condition without the possibility of any accidental or automatic release resulting. Further, the reaction to any attempt at rotation of the wheel is borne by the casing support 10 itself via the mounting of the anchoring member 31 on the casing, so that no wear and tear will be suffered by the latching device 30 and the wheel 40, and lifespan of the caster assembly is extendedly accordingly.

A modified embodiment is shown in Figure 6 wherein the anchoring member 31 of the first embodiment is replaced by an eccentric cam-shaped plate 31 and installed in the support casing 10 with an operating knob 310 extending outward therefrom to form the external operating device. In addition, the spring member 20 is also modified into a helical shape with the free end connected to a lever piece 330 which is engageable with the latching teeth 42. The braking condition is shown by the dotted line, and the efficiency of this embodiment is also the same as that of the first embodiment. In this embodiment also the spring arrangement is able to maintain the latching device in the release position or the latching position following movement thereto.



CLAIMS

1. A caster wheel assembly which comprises an open sided support casing, a bearing provided on the casing, a wheel rotatably mounted on the casing alongside the open side thereof, the wheel being open along one side which faces the open side of the casing, a blind shaft hole provided on the wheel, a shaft mounted in said bearing and said blind hole in order rotatably to mount the wheel on the support casing, latching teeth provided internally of the wheel, a latching device arranged in the casing for movement between a wheel-latching position of engagement with a portion of the latching teeth and a wheel-release position, and an operating device coupled with the latching device and arranged externally of the casing, the operating device being pivotable in order to effect movement of the latching device between its wheel-latching position and its wheel-release position;

in which:

the latching device is provided with a latching element which extends through the open side of the casing and into the wheel, the latching element being movable into latching engagement with a portion of the latching teeth when the latching device is moved to the latching position thereby to prevent rotation of the wheel and to transmit any reaction force to the casing via the mounting of the latching device on the casing; and

a spring arrangement is mounted in the casing and engages with the latching device in such a way as to apply biasing which tends to maintain the device in either its release position or its latching position, following movement of the device against the spring biasing from one position to the other, whereby the latching element is resiliently biased to maintain its latching engagement with the teeth of the wheel against accidental release.



2. A caster wheel assembly according to Claim 1, in which the support casing includes an upright blind hole for receiving a mounting rod member, a positioning pin provided in a lower wall portion of the casing and defining said
5 upright blind hole for securing the rod member in position, an anchor plate mounted in an upright position within the casing on top of said bearing and having an indentation which mounts a lower end of said spring arrangement, a spaced arrangement of teeth provided in the casing defining
10 a narrow tooth space and a wide tooth space for engaging with the spring arrangement, an opening formed in the wall of the casing in which said latching device is movably mounted, and an undulating portion provided on a side face of the casing adjacent to said opening and provided with a
15 pair of aligned holes in which a shaft is mounted for pivotally mounting the latching device, the undulating portion also having a retaining notch for retaining the latching element when the latching device pivots to the latching position.

20 3. A caster wheel assembly according to Claim 2, in which the spring arrangement comprises a fork-shaped spring having its base mounted in said indentation of the anchor plate and having one of its free ends engaged in said narrow tooth space and its other free end engaged in said
25 wide tooth space.

4. A caster wheel assembly according to Claim 2 or 3, in which said operating device and said latching device are formed by an anchoring member having a curved operating surface arranged externally of the casing and a projecting
30 part extending through said opening in the casing, a check pin carried by said anchoring member and forming said latching element for engagement with the latching teeth, and a pivot pin pivotally connecting said anchoring member to said undulating portion of said casing.

35 5. A caster wheel assembly according to Claim 4, in



19 which said anchoring member is slidably engageable with one limb of said spring member.

6. A caster wheel assembly according to Claim 2, in which said spring arrangement comprises a helical spring 5 having one end located in said indentation of said anchor plate and the other end secured to an operating lever pivotally mounted on an inner wall of said casing.

7. A caster wheel assembly according to Claim 1, in which said latching device comprises an eccentric cam 10 shaped member which is pivotally mounted on an outer wall of the casing and which carries said latching element within the casing and said operating device comprises an operating knob arranged externally of the casing, said cam shaped member being movably mounted in said opening of the 15 casing and engaging with said operating knob, and said operating knob projecting from said opening for pivotable manipulation in order to move the cam-shaped member between the wheel-release position and the wheel latching position.

8. A caster wheel assembly according to Claim 1 and 20 substantially as hereinbefore described with reference to, and as shown in any one of the embodiments illustrated in the accompanying drawings.
