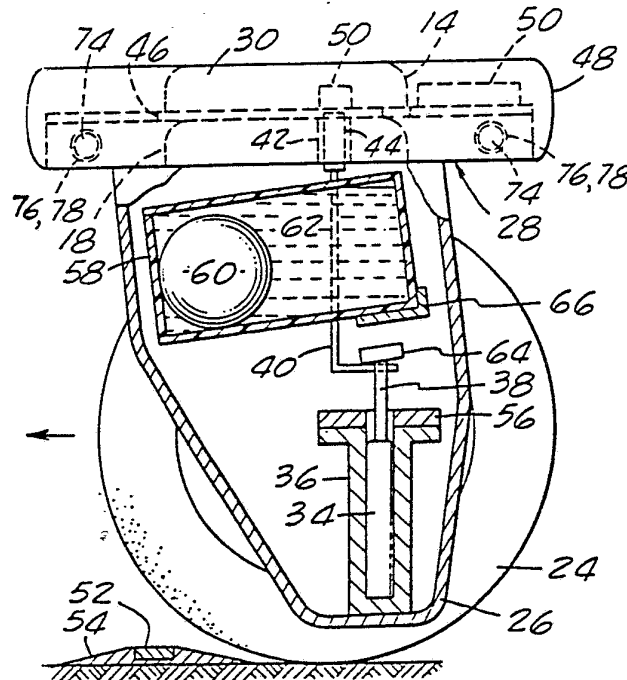




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification³ : B62B 5/04</p>	<p>A1</p>	<p>(11) International Publication Number: WO 84/ 02688 (43) International Publication Date: 19 July 1984 (19.07.84)</p>
<p>(21) International Application Number: PCT/US83/01593 (22) International Filing Date: 11 October 1983 (11.10.83) (31) Priority Application Number: 434,941 (32) Priority Date: 10 January 1983 (10.01.83) (33) Priority Country: US (71) Applicant: KART GUARD INTERNATIONALE, INC. [US/US]; 2072 Third Avenue, San Diego, CA 92101 (US). (72) Inventors: UPTON, Gene ; 28112 Ambar, Mission Viejo, CA 92692 (US). BROWN, Dennis ; 7578 San Miguel, Lemon Grove, CA 92045 (US). (74) Agent: HALLER, John, L.; 2560 First Avenue, Suite 201, San Diego, CA 92103 (US).</p>		<p>(81) Designated States: AT (European patent), AU, BE (European patent), BR, CH (European patent), DE, DE (European patent), DK, FI, FR (European patent), GB (European patent), JP, KP, LU (European patent), NL (European patent), NO, SE (European patent). Published <i>With international search report.</i></p>

(54) Title: SHOPPING CART ANTI-THEFT APPARATUS



(57) Abstract

An anti-theft apparatus for use on a cart and a swivel caster. An upper-race lock ring (30) is mounted on the frame of the cart over the upper race of the caster while a lower-race lock ring (28) is mounted upon the lower race of the caster. A locking pin (44), when actuated, prevents relative rotational motion between the lock rings, as the pin extends into each lock ring. Within a main housing (26) integral with the lower-race lock ring, a thrust magnet (34) is arranged to actuate the locking pin as the apparatus passes over a magnetic actuating strip (52). A tilt-ball (60) and its housing are also shown and will actuate a tilt-ball magnet (64) and the locking pin whenever the front end of the cart is rotated about the axis of the rear wheels of the cart.

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SHOPPING CART ANTI-THEFT APPARATUS

BACKGROUND OF THE INVENTIONField of Invention

5 This invention generally relates to devices for use in the field of anti-theft applications, and more particularly relates to anti-theft apparatus for use with market-type shopping carts and other similar swivel-wheeled carts.

Prior Art

10 Various shopping-cart anti-theft systems have been tried over years with varying degrees of success, but none of them have been adopted as an industry standard, nor has any one of them been recognized as an effective means for preventing
15 theft of shopping carts. At the present time, there are many thousands of markets and stores in the United States, each of which utilize a significant number of shopping carts in or on their premises. The loss rate from thefts is alarmingly high, on
20 the increase, and is extremely expensive for the owners. It is estimated that more than a million shopping carts are stolen annually from markets and stores. At a minimum replacement cost of seventy-five dollars per unit, these thefts equate to
25 annual monetary losses running into many millions of dollars.

Theft prevention programs have been implemented which include the employment of guards who have been hired to monitor the use of the shopping
30 carts, particularly in the parking lot areas of markets and shops. In addition, to having personnel constantly monitor the flow of carts on the market premises, the use of video camera installations has



2.

been employed, but for efficient use thereof, constant monitoring of multiple video screens by additional hired personnel would be required. Other methods which have been tried include the use of
5 optical and electrical sensors and alarm systems, but these approaches are inefficient due to their inability to properly discriminate between the presence of shopping carts versus the presence of
10 automotive vehicles, regardless of the threshold discriminating levels which may conceivably be built into the devices. In essence, the known art is limited to the use of sensing devices of one type or another, but none of the known anti-theft devices include the capability of affecting the
15 physical maneuverability of the cart.

Thus, because of the lack of any known device which is capable of preventing theft by affecting the maneuverability characteristics of a shopping cart, a novel device for accomplishing that specific
20 objective would be extremely useful on all shopping carts used by markets and stores on an extremely wide basis.

SUMMARY OF THE INVENTION

Applicants herein have conceived a new and
25 useful shopping cart anti-theft apparatus which is economical to manufacture and install, while not interfering with the normal use and function of the shopping cart, the main features of this apparatus being summarized in the following paragraphs.

30 The present invention is designed to attach to a caster assembly on a shopping cart and to lock the swivel wheel in a turn-producing position to frustrate non-permissive usage of the cart or the theft thereof. If the cart should be rolled out of
35 the market or store parking lot, it will pass over



3.

a magnetic strip which has been embedded around the perimeter of the parking lot, thereby actuating a thrust magnet which is incorporated in the anti-theft device. Connected to the thrust magnet is a locking pin assembly which is specially designed to lock a stationary upper-race lock ring which is mounted on the cart frame, to a lower-race lock ring while the caster is turned off-center in either direction from its straight-forward position, thereby allowing the cart to travel in a circular manner only while its wheels are in contact with the ground.

The apparatus incorporates another feature which will effectively aid in frustrating any non-permissive use or removal of the cart from the market parking lot premises. As is evident from the proceeding paragraph, the unique anti-theft features which are described herein, depend upon the cart being rolled over a magnetic strip which is embedded in the surface of a parking lot around its perimeter. Accordingly, if the cart were to be tilted upward on its rear wheels as it is passing over the magnetic actuating strip, the thrust magnet could easily be outside of the area of the effective magnetic field of the perimeter magnetic strip and the locking-pin assembly would not be actuated. To solve this problem, an additional tilt-lock feature has been incorporated in this apparatus. A steel tilt-lock ball is placed within a cylindrical housing in a near-horizontal position. The cylindrical tilt-ball housing is filled with a dampening fluid to prevent the tilt-lock ball from being displaced at the wrong time, such as when being subjected to vibration while the cart is being rolled over a rough surface. A tilt-lock



4.

ball housing containing the tilt-lock ball is mounted within the apparatus in such a manner that it will cause the tilt-lock ball to be moved by gravitational force when the cart is tilted up in the front, to a position directly over a tilt-lock magnet which is connected to the upper end of the actuating rod attached to the thrust magnet described hereinabove. A thrust-lock plate is attached to the lower end of the tilt-ball housing and is designed to keep the tilt-lock magnet in contact with it so that if the cart were to be lowered and the tilt-lock ball were to then roll back to its original position, the actuating rod would bias the lock-pin assembly into its locked position between the upper and lower races, locking the swivel wheel at an off-center position, thereby permitting the cart to travel in a circular-arc path only when its wheels are again placed on the ground.

The apparatus is designed such that when the anti-theft device is actuated, it may be easily reset into a non-locked position of the swivel wheel when a specially designed magnetic deactivating bar is placed alongside of the apparatus housing by an individual, such as a store employee. Additional means is provided for retaining the thrust magnet in its operative mode, in order to prevent disengagement or accidental deactivation as a result of an external force, such as vibration, upon the cart or the anti-theft apparatus.

Common inexpensive magnets may be used in this apparatus. The apparatus housing may be made of a single piece of plastic material formed through an inexpensive molding process, requiring no precision tolerances while still being highly resistant to wear and tear in its intended environment. The



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remaining features and elements of the apparatus are equally as simple in form and function and, accordingly, the entire device may be mass-produced at extremely low costs, while still providing a very effective anti-theft function.

The present invention has several features of novelty over the prior art for providing shopping cart anti-theft capability, especially since the known prior art is particularly directed toward visual or sensory detection approaches to the problem of cart theft.

It is, therefore, an object of this invention to be able to place an apparatus directly upon a shopping cart which will cause the swivel wheel of a shopping cart to lock in a cart-turning position, thereby allowing the cart to travel only in a circular path on the ground, thus frustrating the non-permissive use or theft of the cart.

It is another object of this invention to provide a shopping cart anti-theft apparatus which will be operatively actuated whenever the shopping cart is rolled across an actuating magnetic strip located around the perimeter of a market parking lot.

It is still another objective of this invention to provide an anti-theft apparatus for shopping carts which will not interfere in any manner with the normal use and function of the cart.

It is still another object of this invention to provide an anti-theft apparatus for use with a shopping cart which can be manufactured inexpensively, yet ruggedly, while still being effectively durable.



6.

It is still another object of this invention to provide an anti-theft apparatus which can be quickly deactivated in the event that the locking mechanism is actuated.

5 BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows an end view of a typical caster as mounted on a lower segment of a shopping cart.

Figure 2 is also an end view which shows the same caster of Figure 1, and mounted thereon is a housing which contains operable elements of the present invention.

Figure 3 shows a sectional view of the anti-theft apparatus taken along the line 3-3 of Figure 2.

Figure 4 is a lower, perspective view of one embodiment of the upper-race lock ring which is to be mounted on the upper race of the caster and the frame of the cart.

Figure 5 is a sectional view of another embodiment of the anti-theft apparatus and is also taken along line 3-3 of Figure 2.

Figure 6 is a lower, perspective view of another embodiment of the upper-race lock ring which may be mounted on the upper race of the caster and the frame of the cart.

DETAILED DESCRIPTION OF THE INVENTION

In Figure 1, there is shown at 10 a common caster which is mounted to the lower portion of a frame 12 of a typical shopping cart. An upper race 14 is mounted on a plate 16 which, in turn, is attached to shopping cart frame 12 by any convenient means such as welding or by the use of mechanical fasteners. A lower race 18 is rotatably connected to the upper race 14 in such a manner which

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permits race 18 to move, with respect to race 14, in a swivelling fashion. An inverted u-shaped caster frame member 20 is rigidly attached to lower race 18 by any convenient means. An axle 22 is
5 mounted near the lower portions of caster frame member 20 to rotatably support the shopping-cart swivel wheel 24.

In Figure 2, there is shown, for ease of illustration, the same shopping-cart caster 10 as
10 shown in Figure 1 and all of the ordinary elements thereof as described hereinabove, with the addition of a main housing 26 which contains operable elements of the present invention which are described hereinafter. Housing 26 is attached to caster 10 by
15 mounting lower-race lock ring 28 upon lower race 18 and caster frame member 20. For ease of manufacturer, housing 26 and lower-race lock ring 28 may be constructed of a single piece of moulded, inexpensive plastic. An upper-race lock ring 30 is
20 shown mounted on upper race 14, and lock ring 30 may also be secured to cart frame member 12 and plate 16 by any convenient means. Vibration-damping means, which in the present embodiment is a rubber pad 32, is mounted on housing 26 to reduce the
25 effects of vibration between caster frame member 20 and housing 26 including the elements contained therein.

In Figure 3, a thrust magnet 34 is depicted in a thrust-magnet housing 36, and in this embodiment
30 is shown to be in a vertical position. Actuating means is connected to the upper end of thrust magnet 34, said actuating means consisting of, in this embodiment, an actuating rod 38 and an L-shaped locking rod 40 pivotally mounted to actuat-
35 ing rod 38, said L-shaped locking rod 40 extending



8.

upward toward a passage-way 42, located in lower-race lock ring 28. Locking means, consisting of a locking pin 44, in this embodiment, is mounted axially on locking rod 40 at its upper end. A
5 washer 46 is positioned between lower-race lock ring 28 and upper-race lock ring 30 to maintain alignment therebetween. Upper-race lock ring 30 may also include an outer rim 48 which is adapted to protectively lip over the outer perimeter of lower-race lock ring 28 to prevent the disabling of the
10 locking pin 44, which could otherwise be accomplished by inserting a thin object such as a business card between lock rings 28 and 30.

A view of upper-race lock ring 30, without rim
15 48, is shown in Figure 4 from its lower side. A series of recesses, which in this embodiment consist of a series of shallow grooves 50, are radially spaced in the lower surface of lock ring 30 at any convenient angle, but in the present embodi-
20 ment, the angles between the axis of each successive groove are shown at equal spacing of 20° between each groove. Said spacing is indicated for illustration purposes only and is not intended to be a limitation on the scope of the present inven-
25 tion. The width of each groove 50 is of a dimension adequate to permit locking pin 44 to be inserted therein whenever thrust magnet 34 and actuating arm 38 cause the locking rod 40 and the locking pin 44 to be biased in an upward direction when one of the
30 said grooves 50 is in alignment with locking pin 44, thereby locking the caster 10 in a turning position by preventing relative rotational motion between lock ring 28 and lock ring 30, thus further causing the shopping cart to turn in a circle of
35 small radius when it is pushed.



9.

Referring back to Figure 3, the lower end of thrust magnet 34 is located within housing 26 relatively close to the lower portion of the caster 10. Thrust magnet 34 is actuated whenever it passes
5 over a magnetic strip 52 which is located on or within the surface 54 of the perimeter of the area in which the shopping cart is to be confined and used. Accordingly, whenever the shopping cart passes over the magnetic strip 52, locking pin 44
10 will be biased upwards as previously described hereinabove. Further, as soon as any party who may intend to remove the shopping cart from the prescribed premises attempts to make a turn with the cart, locking pin 44 will be biased upwards and
15 will become aligned with and positioned into one of the grooves 50 as a result of the relative rotation between the upper-race lock ring 30 and lower-race lock ring 28 as the cart is turned. The specific groove 50 into which locking pin 44 will be so
20 positioned will depend upon the direction in which the cart is turned and the speed at this it was turned. Locking pin 44 will remain in its locked position; that is, with its upper end inserted into groove 50 as a result of magnetic force created by
25 thrust magnet 34 and the magnetic action of thrust-magnet retaining means. Said thrust-magnet retaining means comprises a thrust-magnet 56, in this embodiment, and is located at the upper end of thrust-magnet housing 36. Only when a specially-
30 designed magnetic bar is placed along the side of housing 26 to deactivate this device, by neutralizing the magnetic force of thrust magnet 34 and thrust-holding magnet 56, will the locking pin 44 be disengaged from groove 50 of the upper-race lock
35 ring 30 as thrust magnet 34, actuating arm 38,



10.

locking rod 40 and locking pin 44 move downward into their unlocked positions as a result of gravity.

In addition to the above-described locking function being activated whenever the cart passes over the perimeter magnetic strip 52, locking action may be achieved by incorporating, as shown in Figure 3, means for biasing locking pin 44 into any groove 50, shown in Figure 4, whenever the shopping cart is tilted upward on its rear wheels. In this event, thrust magnet 34 is not actuated because it is not close enough to the perimeter actuating magnetic strip 52. Said means for biasing locking pin 44, when the shopping cart is tilted upward on its back wheels, herein consists of a tilt-ball housing 58 which is mounted within main housing 58 which is mounted within main housing 26 such that the forward end of housing 58, relative to the direction in which the shopping cart is normally being pushed, is positioned at an angle slightly downward from horizontal. Said downward angle may be at any convenient angle, but for purposes of illustration, it is shown herein at an angle of approximately 15° , however this is not intended as a limitation in the scope of this invention. At tilt-lock ball 60 is contained within said tilt-ball housing 58, and said tilt-lock ball 60 will remain in its passive position at the lower-front end of the tilt-ball housing 58 due to gravity. Any convenient non-corrosive fluid 62 may be placed within housing 58 to produce a damping effect upon tilt-lock ball 60 to keep it from moving from its forward, low position as a result of vibration or from hitting bumps in the surface over which wheel 24 is being rolled.



11.

If the front end of the shopping cart is tilted upward by rotating the cart on the axis of its rear wheels, tilt-ball housing 58, which normally is inclined downward toward its forward end, will pass through a horizontal position and then will further raise up to an upward angle causing the tilt-lock ball 60 to roll backwards to the rear portion of tilt-ball housing 58. Tilt-lock ball 60 may be made of any material having magnetic properties, and when it is in its rearward position as a result of tilting the front end of the shopping cart upwards, a tilt-lock magnet 64, which is located at the upper end of actuating arm 38, is biased upwards as a result of its attraction to the magnetic tilt-lock ball 60. In addition, as tilt-lock magnet 64 moves upward toward tilt-lock ball housing 58 and tilt-lock ball 60, it engages tilt-lock retaining means which, in this embodiment, is a magnetic thrust-lock plate 66 which is connected to the lower rear portion of tilt-ball housing 58. As a result of tilt-lock magnet 64 being attracted to the magnetic tilt-lock ball 60, the actuating arm 38 and locking rod 40 and locking pin 44 are biased upward in the same manner as when they were so biased by the action of thrust magnet 34 when it passed over the magnetic strip 52 located at the perimeter of the confined area. Therefore, when the cart is placed back down with all of its wheels on the ground surface, the swivel wheel 24 will lock into a turning position, in the manner described earlier herein, as soon as the person pushing the shopping cart makes the first turn. At that time, locking pin 44 will be biased upward into locking association with groove 50 of upper-race lock ring 30. It will remain in this turning and locked



12.

position until it is deactivated by someone such as an employee using an appropriate magnetic bar which is not part of this invention.

Briefly referring back to Figure 2, lower-race
5 lock ring 28 may be constructed of a plurality of annular segments. In Figure 2, lock ring 28 is depicted as being made of two segments, i.e. a first segment 68 and a second segment 70 which are joined at line 72, in this view, and at a corresponding line, not seen in this view, diametrically
10 opposed to line 72. Said segments 68 and 70 may be rapidly joined together by any convenient means, such as the tree-type dowel pin 74, in the cutaway portion of Figure 2, one end of which is adapted
15 for tight fit into hole 76 and the other end is similarly fit into hole 78, said holes being formed at right angles to the mating surfaces of each side of said segments 68 and 70. A matching dowel pin, also designated 74, is inserted into similarly
20 matching holes 76 and 78 on the opposing side of lock ring 28. By the use of this arrangement lock ring 28 may be rapidly assembled and disassembled for easy mounting and removal of the main housing 26 from the shopping cart.

25 Another embodiment of this invention is shown in Figure 5, which is a sectional view of the apparatus taken along line 3-3 of Figure 2, and is similar in appearance to the embodiment shown in Figure 3. A thrust magnet 80 is contained in
30 thrust-magnet housing 82 and is adapted to be actuated in the same way as that of thrust-magnet 34, shown in Figure 3, as described previously herein. In this Figure 5, magnet housing 82 has an outer magnetic strip 84, near its upper end,
35 having the same magnetic polarity as the upper end



13.

of thrust magnet 82. Housing 82 also has an outer magnetic strip 86 near the opposite side of its lower end, and which has the same magnetic polarity as the lower end of thrust magnet 80. As wheel 24
5 passes over a magnetic perimeter actuating strip 52, thrust magnet 80 is biased upward and held in that upward position due to a cocking effect of thrust magnet 80 as its upper end moves toward magnetic strip 84, and its lower end moves toward
10 magnetic strip 86 in a manner which will cause the bottom surface of thrust magnet 80 to rest upon an inner ledge 88 of housing 82 located near the bottom of housing 82. An L-shaped actuating rod is connected at its lower end to the upper end of
15 thrust magnet 80, and at its upper end it supports locking pin 92 which is slidably supported within hole 94 in lower-race lock ring 28. The action of L-shaped actuating rod 90 and locking pin 92 is similar to that of locking rod 40 and locking pin
20 44, as previously described hereinabove, and is adapted to prevent relative rotational motion between lock rings 28 and 30 when rod 90 and pin 92 are in their actuated positions.

Further in Figure 5, a steel tilt-ball 96 is
25 contained in the lower portion tilt-ball housing 98 which is positioned at an angle slightly downward from horizontal, similar to housing 50 in Figure 3. Housing 50 contains a damping fluid 100 to prevent undesired motion of tilt-ball 96 from vibration.
30 When the front end of the cart is tilted upwards far enough, tilt-ball 96 will roll to the opposite end of housing 98 and will attract thrust-magnet 80 upward, thereby actuating rod 90 and pin 92 into its locked position, similar to the action of tilt-
35 ball 60, magnet 64, rod 40 and pin 44 of Figure 3, as previously described hereinabove.



14.

In Figure 6, an alternate upper-race lock ring 102 is shown, lock ring 102 having a series of recesses in the lower surface thereof. In this embodiment, the series of recesses therein consist
5 of a series of ratchet teeth 104, and they are adapted to accept locking pin 92 into its recessed portion as pin 92 is actuated and lower-race lock ring 28 is rotated a small amount with respect to upper-race lock ring 102 before the locking func-
10 tion is achieved. A rectangular slot 106 is also shown at an end of the series of ratchet teeth 104 and are placed at such end locations to revert locking pin 92 from moving across the lower surface of lock ring 102 past slot 106 as rotation occurs
15 between lock rings 28 and 102.

Although the present anti-theft apparatus disclosed herein obviously cannot protect against theft by persons who may physically lift the entire shopping cart, and its contents, into the air and
20 carry it for some distance onto a waiting vehicle or to some remote location, it can certainly prevent, or can be an aid in preventing, a more typical type of unauthorized removal which occurs in the majority of cases.

25 Having now described in the invention in detail in accordance with requirements of the patent statutes, those skilled in the art will have no difficulty in making changes and modifications in the individual parts of their relative assembly
30 in order to meet specific requirements or conditions. Such changes and modifications may be made without departing from the scope and spirit of the invention, as set forth in the following claims.



15.

I CLAIM:

1. An anti-theft apparatus for use on a cart in a location having an outer perimeter lined with an actuating magnetic strip, said cart having a swivel caster, the caster having an upper race and a lower race which are rotatable with respect to each other, said caster having a swivel wheel, and said caster being mounted on the frame of the cart, said apparatus comprising, in combination:
- 5
- a) an upper-race lock ring adapted for mounting over the upper race of said swivel caster and to the frame of said cart, said upper-race lock ring having a series of recesses in its lower surface;
- 10
- b) a lower-race lock ring in operable association with said upper-race lock ring, said lower-race lock ring being adapted for mounting on the lower race of said swivel caster;
- 15
- c) locking means in operable association with said upper-race lock ring and said lower-race lock ring, said locking means being adapted to provide for the prevention of rotational motion between the lower-race lock ring and the upper-race lock ring; and,
- 20
- d) actuating means in operable association with said locking means, said actuating means being adapted for biasing and locking means into a position which will prevent relative rotational motion between said upper-race lock ring and said lower-race lock ring,
- 25
- 30
- whereby said swivel caster will be locked into a position which will permit said cart to be turned in a circle of small radius only.



16.

2. The apparatus of Claim 1, above, wherein said locking means comprises a locking pin slidably mounted through said lower-race lock ring, said pin being adapted to be partially biased into any one
5 of said series of recesses in the lower surface of the upper-race lock ring when said caster is turned to a position where is locking pin is aligned with one of said recesses.

3. The apparatus of Claim 2, above, wherein
10 said actuating means consists of:

a) a thrust magnet adapted to be actuated when the caster passes over said perimeter actuating magnetic strip;

b) a locking rod in operable association
15 with said locking pin, said locking rod being adapted to bias said locking pin into its locked position when said locking rod is actuated; and,

c) an actuating rod in operable association with said thrust magnet and said locking rod, said
20 actuating rod being adapted to actuate said locking rod when said thrust magnet is actuated.

4. The apparatus of Claim 2, above, wherein the lower surface of said upper-race lock ring includes a series of grooves, said upper-race lock
25 ring being adapted to receive said locking pin into any one of said grooves upon actuation of said locking pin, and said caster is turned to a position where the locking pin is aligned with one of said grooves, whereby said upper-race ring and said
30 lower-race ring become locked together to prevent relative rotational motion between said lock rings.

5. The apparatus of Claim 2, above, wherein said recesses in the lower surface of said upper-race lock ring consist of a series of ratchet
35 teeth, said upper-race lock ring being adapted to



17.

receive said locking pin into the recessed portion of any one of said teeth upon actuation of said locking pin when said locking pin is aligned with one of said recesses, whereby said upper-race lock ring and said lower-race lock ring become locked together to prevent relative rotational motion between said lock rings.

6. The apparatus of Claim 2, above, wherein said upper-race lock ring, having series of holes therein, is adapted to receive said locking pin into any one of said holes when said locking pin is actuated and said caster is turned to a position where the locking pin is aligned with one of said holes, whereby said upper-race lock ring and said lower-race lock ring become locked together to prevent relative rotational motion between said lock rings.

7. The apparatus of Claim 2, further comprising thrust-magnet retaining means in operable association with said thrust magnet for retaining said thrust magnet in its actuated position upon being actuated when said thrust magnet passes over said perimeter magnetic actuating strip.

8. The apparatus of Claim 4, above, wherein said thrust-magnet retaining means consists of a thrust-holding magnet positioned at a location next to an end of said thrust magnet is moved to its fully actuated position.

9. The apparatus of Claim 2, above, wherein said actuating means consists of:

- a) a tilt-lock ball;
- b) a housing containing said tilt-lock ball, said housing being adapted to retain said ball in a passive position and to bias said ball to another position within said housing whenever the front end of said cart is tilted up to a preselected height off of the ground;



18.

5 c) a tilt-lock magnet in operable association with said tilt-lock ball adapted to be actuated when said tilt-lock ball is moved to a location within the magnetic field of said tilt-lock magnet due to tilting of the front end of said cart to said preselected height; and,

10 d) an actuating rod in operable association with said tilt-lock magnet and said locking means, said actuating rod being adapted to bias said locking means into its locked position when said tilt-lock magnet is actuated when the front end of said cart is tilted up into said preselected height during an attempt to avoid the actuating effect of the perimeter actuating magnetic strip.

15 10. The apparatus of Claim 9, above, wherein said apparatus further comprises tilt-lock retaining means in operable association with said tilt-lock magnet, said tilt-lock retaining means being adapted to retain said tilt-lock magnet in its actuated position upon being actuated when said cart is placed in a tilted position.

20 11. The apparatus of Claim 10, above, wherein said tilt-lock retaining means consist of a thrust-lock plate connected to said tilt-ball housing and adapted to retain said thrust-lock magnet, actuating means and locking means in their locked position.

25 12. The apparatus of Claim 10, above, further comprising a main housing connected to said lower-race lock ring for protectively containing said actuating means and said locking means.

30 13. The apparatus of Claim 12, above, wherein said main housing is narrower in width than the diameter of the caster swivel wheel and is protectively contained within the diametrical dimensions of said caster swivel wheel.



19.

14. The apparatus of Claim 12, above, wherein said apparatus further comprises vibration-damping means operably associated with said main housing, said vibration-damping means being adapted to dampen vibrational forces acting upon said apparatus.

15. The apparatus of Claim 14, above, further comprising a washer operably associated with said upper-race lock ring and said lower-race lock ring, said washer being adapted to maintain alignment between said lock rings during relative rotational motion between said lock rings.

16. The apparatus of Claim 15, above, wherein said lower-race lock ring consists of a plurality of annular segments mechanically fastened together, said lower-race lock ring being adapted to facilitate the rapid mounting and unmounting of the main housing of said apparatus on the lower race of said caster.

17. The apparatus of Claim 15, above, wherein said upper-race lock ring further comprises an outer rim which protectively lips over the outer rim which protectively lips over the outer circumferential surface of said lower-race lock ring to prevent any foreign body from entering the space between said upper-race lock ring and said lower-race lock ring which might otherwise interfere with the locking action of the locking pin and said lock rings.

18. An anti-theft apparatus for use on a cart in a location having an outer perimeter lined with an actuating magnetic strip, said cart having a swivel caster, the caster having an upper race and a lower race which are rotatable with respect to each other, said caster having a swivel wheel, and



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said caster being mounted on the frame of the cart, said apparatus comprising, in combination:

5 a) an upper-race lock ring adapted for mounting over the upper race of said swivel caster and to the frame of said cart;

b) a lower-race lock ring in operable association with said upper-race lock ring, said lower-race lock ring being adapted for mounting on the lower race of said caster;

10 c) locking means in operable association with said upper-race lock ring and said lower-race lock ring, said locking means being adapted to provide for the prevention of rotational motion between the lower-race lock ring and the upper-race
15 lock ring;

d) actuating means in operable association with said locking means, said actuating means being adapted for biasing said locking means into a position which will prevent relative rotational motion
20 between said upper-race lock ring and said lower-race lock ring; and,

e) thrust-magnet retaining means consisting of:

25 i) a thrust-magnet housing for containing said thrust magnet, said thrust-magnet housing having an inner ledge located near the lower inner surface of said thrust-magnet housing;

30 ii) a first magnetic strip, located near the upper end of said thrust-magnet housing, on the outer surface of said thrust-magnet housing at a location on the side opposite that of said inner ledge, said magnetic strip being adapted to attract the upper end of the thrust magnet to the upper inside surface of said thrust-magnet housing; and,



21.

iii) a second magnetic strip, located near the lower end of said thrust-magnet housing, on the outer surface of said thrust-magnet housing at a location next to, and slightly above, said inner ledge, said second magnetic strip being adapted to attract the lower end of the thrust magnet to the lower inside surface of the thrust magnet housing directly above said inner ledge,

whereby said thrust magnet will be retained in its activated position upon said inner ledge, by the attraction between said magnetic strips and said thrust magnet, when said thrust magnet is actuated by passing over said perimeter magnetic actuating strip.



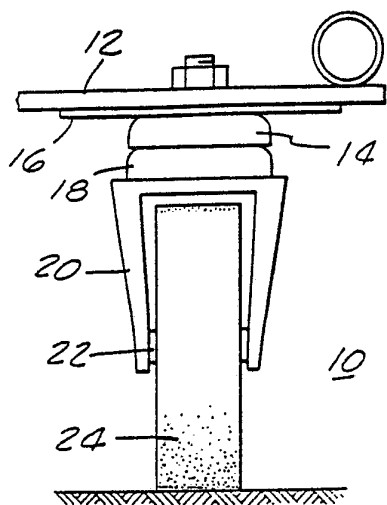


FIG. 1.

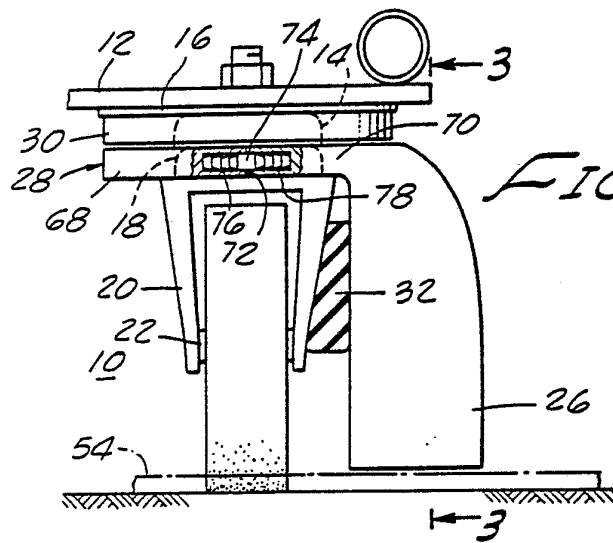


FIG. 2.

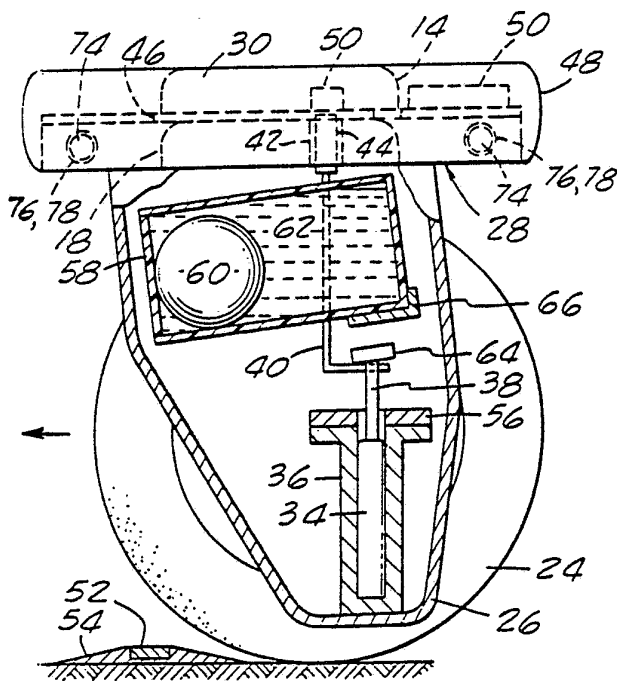


FIG. 3.

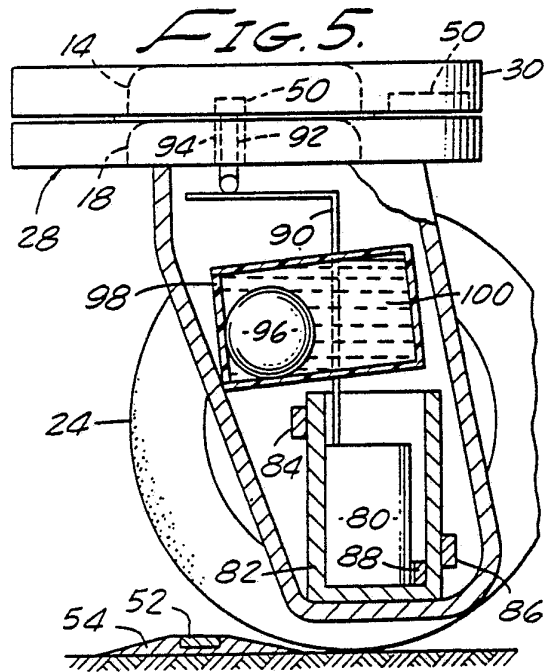


FIG. 5.

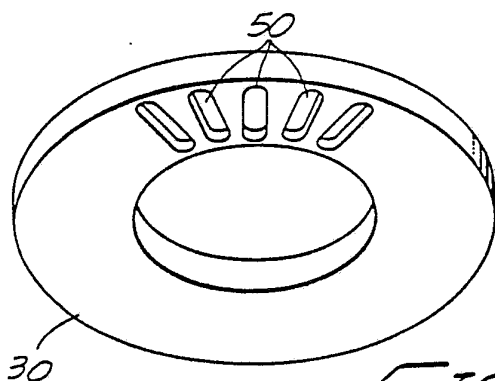


FIG. 4.

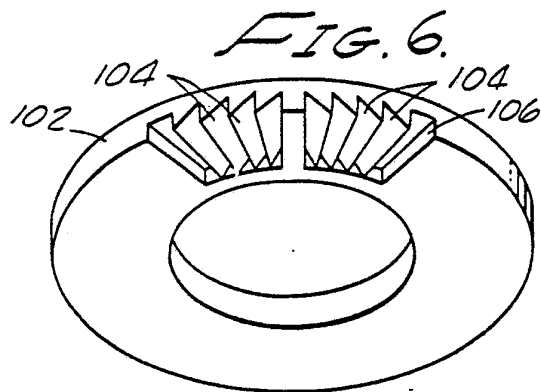


FIG. 6.

INTERNATIONAL SEARCH REPORT

International Application No PCT/US 83/01593

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ³ B62B 5/04		
U.S. Cl. 280/33.99C		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
US	280/33.99C, 33.99R 16/35R	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁵		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category [*]	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
A	US, A, 3,031,038, (CHAIT) 24 April 1962.	1-18
A	DE, A, 2,310,777, (MEISTER) 19 September 1974	1-18
A	GB, A, 2,033,742, (BROWN) 22 May 1980	1-18
A	US, A, 3,828,392, (BOLGER) 13 August 1974	1-18
A	US, A, 3,495,688, (ISAACKS) 17 February 1970	1-18
A	US, A, 2,964,140, (BEREZNY) 13 December 1960	1-18
A	US, A, 3,356,185, (ISAACKS) 05 December 1967	1-18
A	US, A, 3,083,398, (SWALM) 02 April 1963	1-18
<p>[*] Special categories of cited documents: ¹⁵</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ²	Date of Mailing of this International Search Report ³	
03 January 1984	06 JAN 1984	
International Searching Authority ¹	Signature of Authorized Officer ¹⁹	
ISA/US	David M. Mitchell	