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(54) **ANTI-THEFT VEHICLE SYSTEM**

ANTI-DIEBSTAHLSYSTEM FÜR FAHRZEUGE

DISPOSITIF ANTIVOL DE VEHICULE

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(56) References cited:
WO-A-82/01437 WO-A-96/21206
US-A- 3 415 144 US-A- 3 809 191
US-A- 4 809 824 US-A- 5 000 297
US-A- 5 194 844 US-A- 5 315 290

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Description**BACKGROUND OF THE INVENTION****1. Field Of the Invention**

[0001] The present invention relates generally to vehicles and, more particularly, to an anti-theft vehicle system used to inhibit rotation of a vehicle wheel outside a predetermined spatial perimeter.

2. Description Of the Related Art

[0002] It is sometimes desired to contain a vehicle within a predetermined spatial boundary or perimeter. In particular, retail stores are attempting to reduce the amount of lost vehicles such as shopping carts, which are either stolen or taken out of the normal bounds of the stores and not returned.

[0003] Accordingly, United States Patent No. 5,194,844 to Zeldi discloses a vehicle theft prevention system which inhibits the use of a shopping cart once it is moved outside a boundary. This patented system includes an electronic wire that extends around and defines a perimeter of normal operating space which is used by operators of a store's shopping carts. The electronic wire produces an electromagnetic field which is sensed by a sensor located adjacent one wheel of the shopping cart. The sensor sends a signal to a motor which moves a brake pad against the wheel of the shopping cart. Two limit switches are used to stop the motor when the motor has either moved the brake pad into or out of engagement with the wheel of the shopping cart.

[0004] One disadvantage of the above system is that it is relatively expensive because the motor must be large and two limit switches are needed. Another disadvantage of the above system is that an asymmetric time-variant wave form is used for the electromagnetic field which is undesired.

[0005] Moreover, Patent US 5315290 A to Moreno et al discloses another cart immobilising system according to the preamble of claim 1. The cart contains a solenoid device having a coil and armature, which can move in and out of an opening disposed on the axle of the cart wheel. Transmitted signals cause the armature to move into and out of the opening to lock and unlock the wheel. The signals are transmitted using a limited range radio frequency transmitter. One disadvantage of the above system is that interfering radio signals can inadvertently cause the armature to move, thereby locking and/or unlocking the wheel at undesired times.

SUMMARY OF THE INVENTION

[0006] It is, therefore, one object of the present invention to provide an anti-theft vehicle system for vehicles.

[0007] It is another object of the present invention to provide an anti-theft vehicle system for vehicles such as

shopping carts, toys, wheeled inventory, and industrial forklifts.

[0008] It is yet another object of the present invention to provide an anti-theft vehicle system for a vehicle wheel to prevent an operator from moving to the vehicle outside a predetermined spatial perimeter.

[0009] It is still another object of the present invention to provide an anti-theft vehicle system for a shopping cart wheel which is inexpensive and effective at making it difficult for an operator to move the shopping cart out of a predetermined operating area of a retail store.

[0010] To achieve the foregoing objects, the present invention is an anti-theft vehicle system for a vehicle wheel according to claim 1.

[0011] One advantage of the present invention is that an anti-theft vehicle system is provided for vehicles such as shopping carts, toys, wheeled inventory, and industrial forklifts. Another advantage of the present invention is that the anti-theft vehicle system provides a vehicle wheel which deters an operator from moving the vehicle outside a predetermined spatial perimeter. Yet another advantage of the present invention is that the anti-theft vehicle system provides a cost effective vehicle wheel to deter operators from taking shopping carts out of a retail store's shopping cart boundary by preventing the vehicle wheel from rotating. Still another advantage of the present invention is that the anti-theft vehicle system provides a one-piece brake, springs and component mounting area for the vehicle wheel. A further advantage of the present invention is that the anti-theft vehicle system is self-energizing in both directions. Yet a further advantage of the present invention is that the anti-theft vehicle system provides a linkage overrun for position lock of the vehicle wheel. Still a further advantage of the present invention is that the anti-theft vehicle system changes the angle of a thrust arm to maximize brake linkage efficiency.

[0012] Other objects, features and advantages of the present invention will be readily appreciated as the same becomes better understood after reading the subsequent description when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

FIG. 1 is a perspective view of a anti-theft vehicle system, illustrated in operational relationship with vehicles and a predetermined spatial perimeter.

FIG. 2 is a perspective view of a vehicle and the anti-theft vehicle system of FIG. 1.

FIG. 3 is an exploded view of a wheel of the vehicle and the anti-theft vehicle system of FIG. 2.

FIG. 4 is a sectional view taken along line 4-4 of FIG. 3.

FIG. 5 is a sectional view taken along line 5-5 of FIG. 4.

FIG. 6 is a schematic view of a control circuit of the anti-theft vehicle system of FIGS. 1 through 3,

Fig. 7 is a schematic view of a transmitting circuit,

Fig. 8 is a schematic view of a control circuit for an anti-theft vehicle system embodying the invention,

Fig. 9 is a schematic view of a transmitting circuit,

Fig 10 is a schematic view of the circuit 200.

DESCRIPTION OF THE PREFERRED EMBODIMENT **(S)**

[0014] Referring to FIG. 1, an anti-theft vehicle system 10, is shown in operational relationship with vehicles inside a predetermined spatial boundary. The system 10 is may be used to prevent theft of vehicles such as shopping carts 22 from a predetermined spatial boundary or perimeter 11a of a retail store 11b. It should be appreciated that the system 10 may be used on other vehicles such as toys, wheeled inventory, industrial forklifts to prevent the same from exiting a predetermined spatial boundary.

[0015] As illustrated in FIGS. 2 through 5, the system 10 includes at least one wheel 12 for the vehicle embodiment of a shopping cart 22. The wheel 12 has an inner diameter 14 and an outer diameter 16 and a rotational axis A about which the wheel 12 rotates. The wheel 12 also has a housing or hub 18 and a surface engaging member 20. The surface engaging member 20 is made of a suitable material such as a plastic material. Preferably, the plastic material is a urethane material. The hub 18 may be fabricated from the same material as the surface engaging member 20. Preferably, the hub 18 is made of a plastic material such as ABS and secured to the surface engaging member 20.

[0016] The system 10 also includes at least one inhibitor 24 disposed within the wheel 12 to selectively engage the wheel 12 and prevent the wheel 12 from rotating about its rotational axis A. The inhibitor 24 is a partial cylindrical shaped brake pad which is forced against the inner diameter 14 or hub 18 of the wheel 12. Preferably a second inhibitor 26 is disposed within the wheel 12 to selectively engage another portion of the hub 18 of the wheel 12. The second inhibitor 26 is also a partial cylindrical shaped brake pad which is forced against the inner diameter 14 of the wheel 12 or hub 18. The inhibitors 24, 26 are integral and made of one-piece. The inhibitors 24, 26 are fabricated from a plastic material, such as a glass reinforced nylon material, which has a memory quality to maintain the shape of the inhibitors 24, 26. The inhibitors 24, 26 have a spring 27a connected to an extension 27b which acts as a component mounting area. The memory

quality of the plastic material for the springs 27a creates a spring-like force predisposing the inhibitors 24, 26 to disengage the wheel 12. It should be appreciated that the inhibitors 24, 26, springs 27a and extension 27b are fabricated as one-piece from the same material.

[0017] The system 10 further includes an axle pin or shaft 28 which acts as the rotational axis A for the wheel 12. The shaft 28 is made of a metal material such as steel. The system 10 also includes two waterproof bearings 30 and yoke lock plates 32 supported by the shaft 28. The yoke lock plates 32 have internal notches 33 which engage an axle 34 and prevent the axle 34, which rides along the shaft 28, from rotating. The yoke lock plates 32 also include tabs 36 which prevent the waterproof bearings 30 from rotating.

[0018] The system 10 includes an axle arm 38 securely mounted such as by welding about the axle 34. The axle arm 34 is a plate made of a metal material such as steel. The extension 27b is connected to the axle arm 38 by suitable means such as an adhesive. The system 10 also includes a motor 40 such as an electric motor mounted to the extension 27b of the inhibitors 24, 26 between the rotational axis A and the inner diameter 14. The motor 40 provides rotational movement independent of the movement of the wheel 12 along an axis defined by a motor shaft 42. The motor 40 receives power from a power source such as a battery 43 which is electrically connected to both the motor 40 and a wheel controller 72 to be described. It should be appreciated that the battery 43 is attached to the extension 27b of the inhibitors 24, 26 by suitable means.

[0019] The system 10 further includes a screw or worm gear 44 rotated by the motor 40 through a gear drive 46. The gear drive 46 allows the motor 40 to be placed along side the worm gear 44, conserving space, and reduces the rotational speed of the worm gear 44. More specifically, the gear drive 46 includes a first gear 48 and a second gear 50 such that the second gear 50 has a larger diameter than the first gear 48. The first gear 48 is secured to the motor shaft 42 and rotates at a faster rate than the second gear 50 which is driven by the first gear 48. It should be appreciated that the gear drive 46 may use any number of gears and gear sizes depending on the size and motor speed requirements.

[0020] The system 10 also includes a drive arm or lever 52 connected to the inhibitors 24, 26. The lever 52 has a pivotal end 54 and a gear engaging end 56. The gear engaging end 56 receives the worm gear 44 and moves along the worm gear 44 as the worm gear 44 is rotated. The gear engaging end 56 includes a nut 58 for receiving the worm gear 44 therein and rides along the worm gear 44 as the nut 58 receives the threads 60 of the worm gear 44.

[0021] The lever 52 pivots about a pivot end 54 which is pivotally secured to the extension 27b of the inhibitors 24, 26. When the lever 52 pivots about the pivot end 54, the inhibitors 24, 26 and the wheel 12 engage to prevent the rotational movement of the wheel 12. If, however, the

inhibitors 24, 26 are all ready engaging the wheel 12, the motor 40 will reverse to pivot the lever 52 back toward the motor 40 to disengage the inhibitors 24, 26 from the wheel 12, allowing the wheel 12 to rotate along with the other wheels of the shopping cart 22.

[0022] The system 10 also includes a linkage, generally indicated at 62, to connect the inhibitors 24, 26 to the lever 52. The linkage 62 is connected to the lever 52 between the pivotal end 54 and the gear engaging end 56. The linkage 62 includes a first thrust arm or link 64 and a second thrust arm or link 66 which are pivotally moveable with respect to each other. The first and second links 64 and 66 are pivotally secured to each of the first and second inhibitors, 24 and 26, respectively.

[0023] The linkage 62 further includes a transfer arm or principle link 68 which is pivotally secured to the first and second links 64 and 66 and the lever 52. The movement allowed by the principle link 68 forces the first and second links 64 and 66 to move in opposite directions. When the two links 64, 66 move in opposite directions, the first and second inhibitors 24, 26 move in opposite directions, either into engagement or disengagement with the hub 18 of the wheel 12. Although not necessary, the first and second links 64 and 66 are identical in shape and move not only in opposite directions but with equal magnitude. Further, the cost of the system 10 is further reduced by having the first, second and principle links 64, 66 and 68 fabricated to the same shape and size. This reduces the cost of the system 10 further by reducing parts.

[0024] Referring to FIG. 6, the anti-theft vehicle system 10 includes a control circuit generally shown at 69, for the system 10. The control circuit 69 is a circuit board overlay which is disposed within the hub 18 of the wheel 12. The control circuit 69 includes a receiver 70 for receiving a signal to activate the motor 40 to move the inhibitors 24, 26 such that the inhibitors 24, 26 either engage or disengage the wheel 12. Preferably, the receiver 70 is an antenna which receives a signal such as an RF signal created by a signal generator 74 to be described.

[0025] The control circuit 69 also includes a wheel controller 72 which receives the signal from the antenna 70 and is electrically connected between the antenna 70 and the motor 40. The wheel controller 72 selectively activates the motor 40 based on perimeter parameters received from the antenna 70. The perimeter parameters are created by a signal generator 74 and buried wire cable 76 to be described and illustrated in FIG. 1.

[0026] The wheel controller 72 includes a tuned receiver 78 which receives the signals from the antenna 70 and a tone decoder 80. The tuned receiver 78 amplifies the signal and sends it to the tone decoder 80 for decoding the perimeter parameters signal. The wheel controller 72 also includes a flip flop retrieval deactivation circuit 82 and a motor controller timer 84 which receives the signal once it has been decoded. The flip flop retrieval deactivation circuit 82 determines which direction the motor 40 is to rotate the motor shaft 42. More specifically, the flip

flop retrieval deactivation circuit 82 will signal the motor controller timer 84 to operate the motor 40 dependent upon the input received by the flip flop retrieval deactivation circuit 82 and the tone decoder 80. The wheel controller 72 includes a the master timer 86 which receives input from a rotation sensor 88 such as a magnet of the control circuit 69.

[0027] For example, the flip flop retrieval deactivation circuit 82 receives input from the tuned receiver 78 stating the location of the shopping cart 22 has changed such that the shopping cart 22 has passed over the buried wire cable 76 signifying that the shopping cart 22 has passed either into or out of the perimeter parameters defined by the buried wire cable 76. The flip flop retrieval deactivation circuit 82 then determines whether the shopping cart 22 was inside or outside the buried wire cable 76 by determining whether the wheel 12 was rotating. From the rotation sensor 88, determination of the rotation of the wheel 12 will determine whether the shopping cart 22 was inside or outside of the buried wire cable 76. If the rotation sensor 88 receives no signal, the wheel 12 is not rotating and is already locked. Therefore, receiving a signal from the tuned receiver 78 will indicate that the shopping cart 22 has passed back into the perimeter of the allowed area for the shopping cart 22 to operate. The rotational state of the wheel 12 goes from a non-rotating state to a rotating state. If, however, the flip flop retrieval deactivation circuit 82 receives a signal from the tuned receiver 78 when the rotation sensor 88 is sending a signal indicating that the wheel 12 is rotating, it will be determined that the shopping cart 22 has moved to a location outside of the perimeter defined by the buried wire cable 76 and will turn the motor 40 such that the inhibitors 24, 26 will about the wheel hub 18 preventing the wheel 12 from rotating. Thus, the rotational state of the wheel has gone from a rotating state to a non-rotating state.

[0028] The signal generator 74, shown in FIG. 1, generates a square wave output having a low frequency cycle between 60Hz and 1kHz which is sent along the buried wire cable 76 and defines the area in which the shopping cart may operate. The signal generator 74 may be any type of signal generator suitable to produce a signal which will pass along the entire length of the buried wire cable 76.

[0029] The present invention has been described in an illustrative manner. It is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

Claims

1. An anti-theft vehicle system (10) comprising:

- at least one vehicle wheel (12) having a rotational axis (A);
- at least one inhibitor (24) disposed within said at least one vehicle wheel (12) to selectively en-

gage and disengage said at least one vehicle wheel (12) to prevent and allow rotation of said at least one vehicle wheel (12) about the rotational axis (A);

a rotatable means disposed within said at least one vehicle wheel (12) and cooperating with said at least one inhibitor (24) for moving said at least one inhibitor (24) between an engaged position and a disengaged position with respect to said at least one vehicle wheel (12); and

a receiver including an antenna (116), the receiver (122) being (122) mounted within said at least one vehicle wheel (12) to receive a predetermined signal to activate said rotatable means to move said at least one inhibitor (24) between said engaged position and said disengaged position;

characterised in that:

said receiver (122) further includes a resonant tank circuit (138) electrically connected to said antenna (116), a gain stage circuit (140) electrically connected to said resonant tank circuit (138) a detector (142) electrically connected to said gain stage circuit (140), a post detection amplifier (143) electrically connected to said detector (142), an address set switch (144) having a plurality of different switches (146) set to a predetermined code, and a decoder (148) electrically connected to said post detection amplifier (143) and to the address set switch (144) to determine whether the predetermined signal matches the predetermined code to allow the wheel (12) to be locked or unlocked.

2. An anti-theft vehicle system according to claim 1, wherein said rotatable means includes an electric motor (40) to provide rotational movement.
3. An anti-theft vehicle system (10) according to claim 1 or claim 2, wherein said system (10) includes a transmitting circuit (114) for transmitting the predetermined signal.
4. An anti-theft vehicle system (10) according to claim 1, further comprising a transmitting circuit (114) for generating the predetermined signal and defining a predetermined spatial perimeter such that said receiver (69, 122) receives the predetermined signal when said at least one vehicle wheel passes the predetermined spatial perimeter.
5. An anti-theft vehicle system (10) according to claim 4, wherein said transmitted circuit (114) includes an oscillator (118) to create at least one carrier frequency.

6. An anti-theft vehicle system (10) according to claim 5, wherein said transmitting circuit (114) includes an antenna (132) of electrically conductive material to transmit the predetermined signal along and define the predetermined spatial perimeter.

7. An anti-theft vehicle system (10) according to claim 1, wherein said receiver (69, 122) includes a latch (157) electrically connected to the decoder (148) to reset the decoder (148) to prevent redundant lock and unlock actuations.

8. An anti-theft vehicle system (10) according to claim 1, wherein said receiver (69, 122) includes a stall detection circuit (158) electrically connected to the motor (40) to detect when the motor (40) stops the rotational movement.

20 Patentansprüche

1. Diebstahlverhinderungssystem (10) für Fahrzeuge, das aufweist:

wenigstens ein Fahrzeugrad (12), das eine Drehachse (A) hat;

wenigstens eine Hemmeinrichtung (24), die innerhalb des wenigstens einen Fahrzeugrades (12) angeordnet ist, um selektiv mit dem wenigstens einen Fahrzeugrad (12) in Eingriff zu kommen und außer Eingriff zu kommen, um Drehung des wenigstens einen Fahrzeugrades (12) um die Drehachse (A) zu verhindern und zu erlauben;

drehbare Mittel, die innerhalb des wenigstens einen Fahrzeugrades (12) angeordnet sind und mit der wenigstens einen Hemmeinrichtung (24) zusammenwirken, um die wenigstens eine Hemmeinrichtung (24) zwischen einer Eingriffstellung und einer Nichteingriffstellung in Bezug auf das wenigstens eine Fahrzeugrad (12) zu bewegen; und

einen Empfänger, der eine Antenne (11b) einschließt, wobei der Empfänger (122) innerhalb des wenigstens einen Fahrzeugrades (12) angebracht ist, um ein vorbestimmtes Signal zu empfangen, die drehbare Mittel zu aktivieren, die wenigstens eine Hemmeinrichtung (24) zwischen der Eingriffstellung und der Nichteingriffstellung zu bewegen;

dadurch gekennzeichnet, dass

der Empfänger (122) weiter einen Resonanztankkreis (138), der elektrisch mit der Antenne (116) verbunden ist, eine Verstärkerstufenschaltung (140) die elektrisch mit dem Resonanztankkreis (138) verbunden ist, einen Detektor (142), der elektrisch mit der Verstärkerstufenschaltung (140) verbunden ist, einen

- Nachdetektionsempfänger (143), der elektrisch mit dem Detektor (142) verbunden ist, einen Adresseneinstellschalter (144), der eine Mehrzahl von unterschiedlichen Schaltern (146) hat, um einen vorbestimmten Code einzustellen, und einen Decoder (148) einschließt, der elektrisch mit dem Nachdetektionsverstärker (143) und mit dem Adresseinstellschalter (144) verbunden ist, um zu bestimmen, ob das vorbestimmte Signal mit dem vorbestimmten Code zusammenpasst, um zu ermöglichen, dass das Rad (12) verriegelt oder entriegelt wird.
2. Diebstahlverhinderungssystem für ein Fahrzeug nach Anspruch 1, bei dem die drehbaren Mittel einen elektrischen Motor (40) einschließen, um Drehbewegung zu liefern.
 3. Diebstahlverhinderungssystem (10) für ein Fahrzeug nach Anspruch 1 oder Anspruch 2, bei dem das System (10) eine Sendeschaltung (114) zum Übertragen des vorbestimmten Signals einschließt.
 4. Diebstahlverhinderungssystem (10) für ein Fahrzeug nach Anspruch 1, das weiter eine Sendeschaltung (114) zum Erzeugen des vorbestimmten Signals und zum Definieren eines vorbestimmten räumlichen Umkreises einschließt, so dass der Empfänger (69, 122) das vorbestimmte Signal empfängt, wenn wenigstens ein Fahrzeugrad sich über dem vorbestimmten räumlichen Umkreis bewegt.
 5. Diebstahlverhinderungssystem (10) für ein Fahrzeug nach Anspruch 4, bei dem die Sendeschaltung (114) wenigstens einen Oszillator (118) einschließt, um wenigstens eine Trägerfrequenz zu erzeugen.
 6. Diebstahlverhinderungssystem (10) nach Anspruch 5, bei dem die sendende Schaltung (114) eine Antenne (132) aus elektrisch leitendem Material einschließt, um das vorbestimmte Signal entlang des vorbestimmten räumlichen Umkreises zu senden und diesen zu definieren.
 7. Diebstahlverhinderungssystem (10) für Fahrzeuge nach Anspruch 1, bei dem der Empfänger (69, 122) eine Sperre (157) einschließt, die elektrisch mit dem Decoder (148) verbunden ist, um den Decoder (148) zurückzusetzen, um redundante Verriegelungs- und Entriegelungsbetätigungen zu vermeiden.
 8. Diebstahlverhinderungssystem (10) für Fahrzeuge nach Anspruch 1, bei dem der Empfänger (69, 122) eine Blockierdetektionsschaltung (158) einschließt, die elektrisch mit dem Motor (40) verbunden ist, um festzustellen, wenn der Motor (40) die Drehbewegung anhält.

Revendications

1. Système antivol de véhicule (10), comprenant :

au moins une roue de véhicule (12) ayant un axe de rotation (A) ;
 au moins un dispositif d'entrave (24), disposé à l'intérieur de ladite au moins une roue de véhicule (12), pour s'engager et se dégager sélectivement de ladite au moins une roue de véhicule (12), afin d'empêcher et de permettre la rotation de ladite au moins une roue de véhicule (12) autour de l'axe de rotation (A) ;
 un moyen rotatif disposé à l'intérieur de ladite au moins une roue de véhicule (12), et coopérant avec ledit au moins un dispositif d'entrave (24) pour déplacer ledit au moins un dispositif d'entrave (24) entre une position engagée et une position dégagee par rapport à ladite au moins une roue de véhicule (12) ; et
 un récepteur (122) incluant une antenne (116), le récepteur (122) étant monté à l'intérieur de ladite au moins une roue de véhicule (12), pour recevoir un signal prédéterminé afin d'activer ledit moyen rotatif pour déplacer ledit au moins un dispositif d'entrave (24) entre ladite position engagée et ladite position dégagee ;

caractérisé en ce que :

ledit récepteur (122) inclut, en outre, un circuit bouchon résonnant (138) connecté électriquement à ladite antenne (116), un circuit d'étage de gain (140) connecté électriquement audit circuit bouchon résonnant (138), un détecteur (142) connecté électriquement audit circuit d'étage de gain (140), un amplificateur de post détection (143) connecté électriquement audit détecteur (142), un commutateur d'établissement d'adresse (144) ayant une pluralité de commutateurs différents (146), définis sur un code prédéterminé, et un décodeur (148), connecté électriquement audit amplificateur de post détection (143) et audit commutateur d'établissement d'adresse (144) pour déterminer si le signal prédéterminé correspond ou non au code prédéterminé, afin de permettre que la roue (12) soit bloquée ou non.

2. Système antivol de véhicule selon la revendication 1, dans lequel ledit moyen rotatif inclut un moteur électrique (40) pour fournir un mouvement de rotation.
3. Système antivol de véhicule (10) selon la revendication 1 ou 2, dans lequel ledit système (10) inclut un circuit d'émission (114) permettant d'émettre le

signal prédéterminé.

4. Système antivol de véhicule (10) selon la revendication 1, comprenant, en outre, un circuit d'émission (114) permettant de générer le signal prédéterminé et de définir un périmètre spatial prédéterminé, de telle sorte que ledit récepteur (69, 122) reçoit le signal prédéterminé lorsque ladite au moins une roue de véhicule franchit le périmètre spatial prédéterminé. 5
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5. Système antivol de véhicule (10) selon la revendication 4, dans lequel ledit circuit d'émission (114) inclut un oscillateur (118) pour créer au moins une fréquence porteuse. 15
6. Système antivol de véhicule (10) selon la revendication 5, dans lequel ledit circuit d'émission (114) inclut une antenne (132) en matériau conducteur électriquement, pour émettre le signal prédéterminé le long, et définir le périmètre spatial prédéterminé. 20
7. Système antivol de véhicule (10) selon la revendication 1, dans lequel ledit récepteur (69, 122) inclut un verrou (157), connecté électriquement au décodeur (148) pour réinitialiser le décodeur (148) afin d'empêcher toute opération de blocage / déblocage redondante. 25
8. Système antivol de véhicule (10) selon la revendication 1, dans lequel ledit récepteur (69, 122) inclut un circuit de détection d'arrêt (158), connecté électriquement au moteur (40), pour détecter le moment où le moteur (40) arrête le mouvement de rotation. 30
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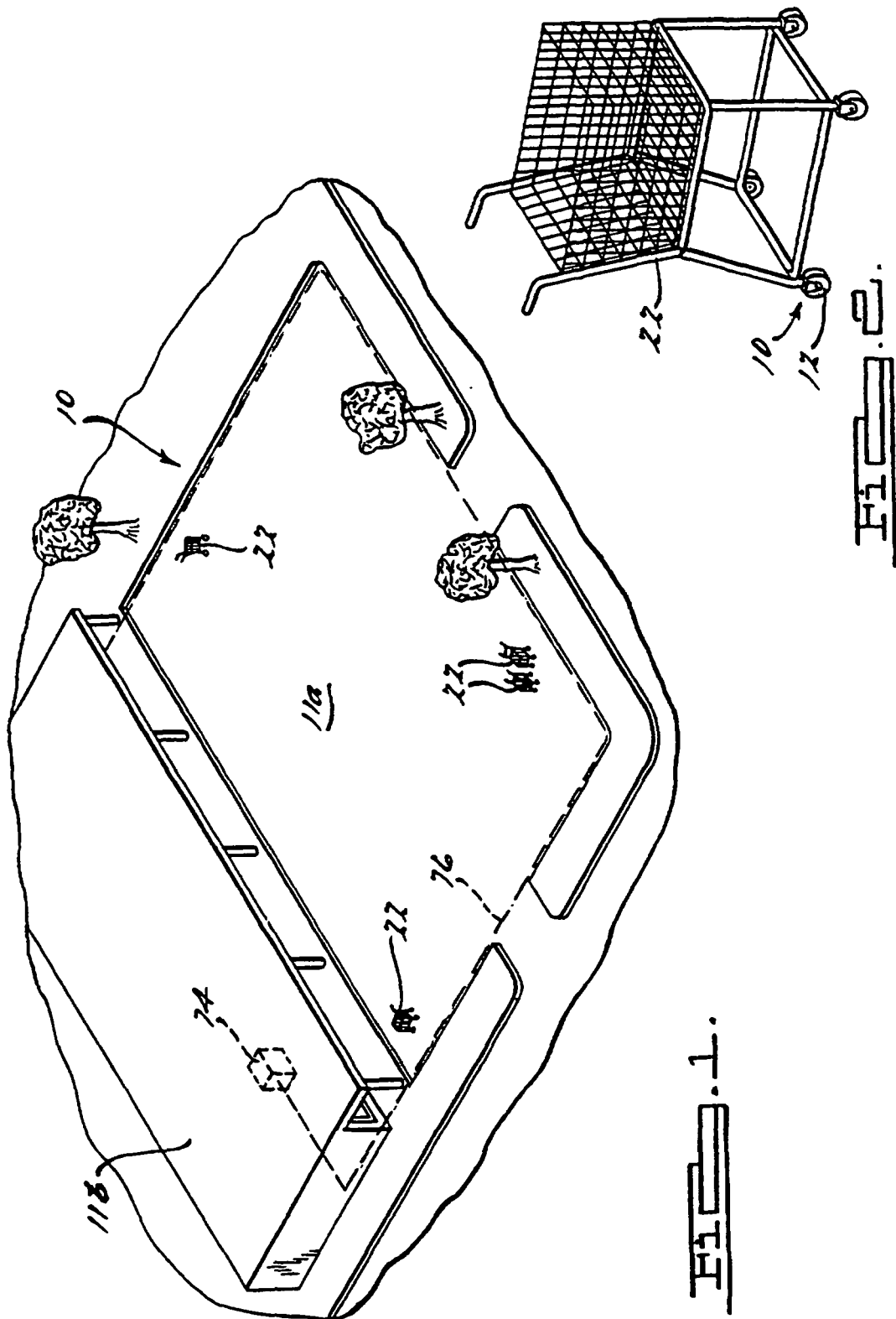


FIG. 1.

