June 19, 1956 R. B. McLAUGHLIN 2,751,027

ENDLESS TRACK SUPPORTED INVALID CHAIR

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Fig. 1.

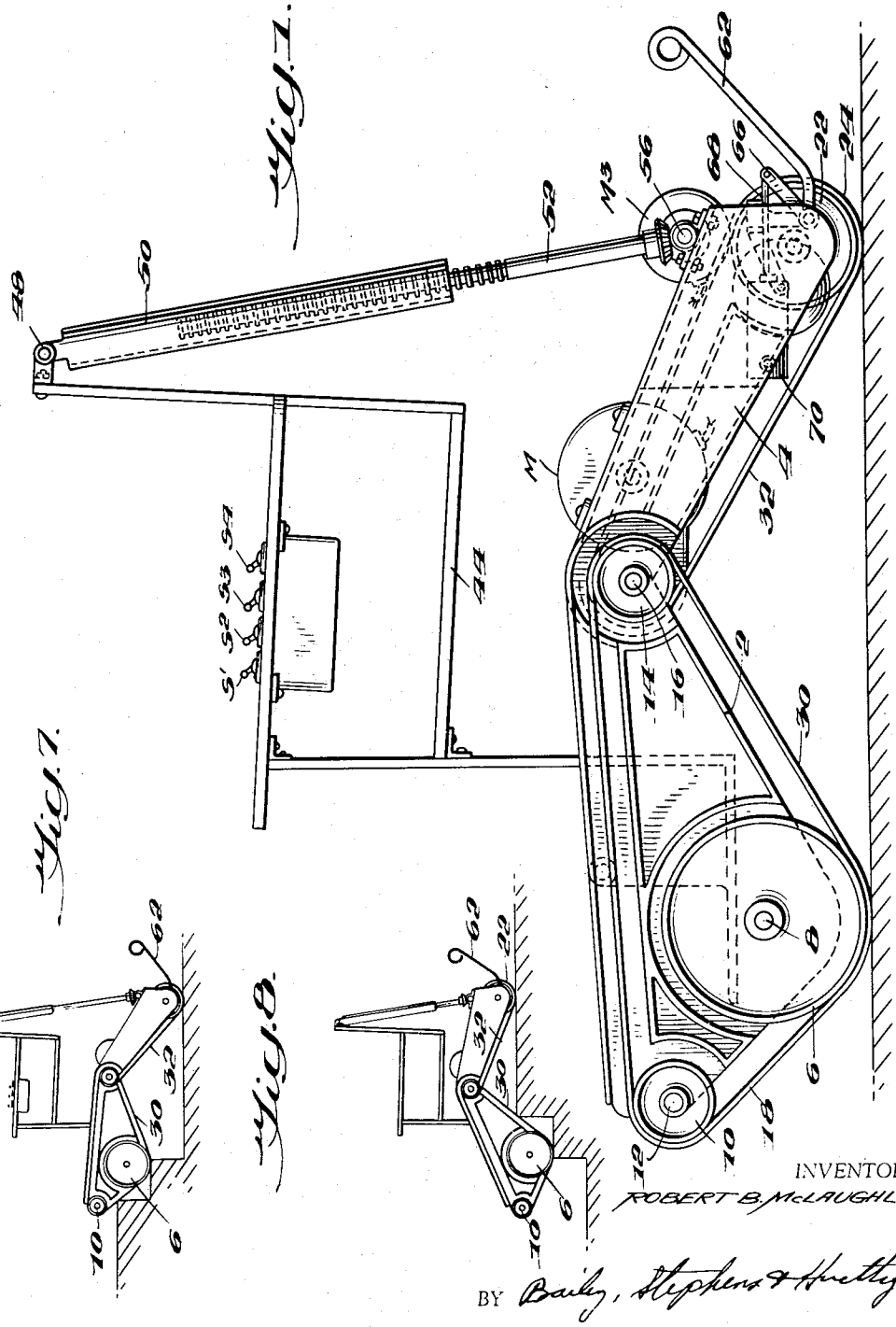

Fig. 7.

Fig. 8.

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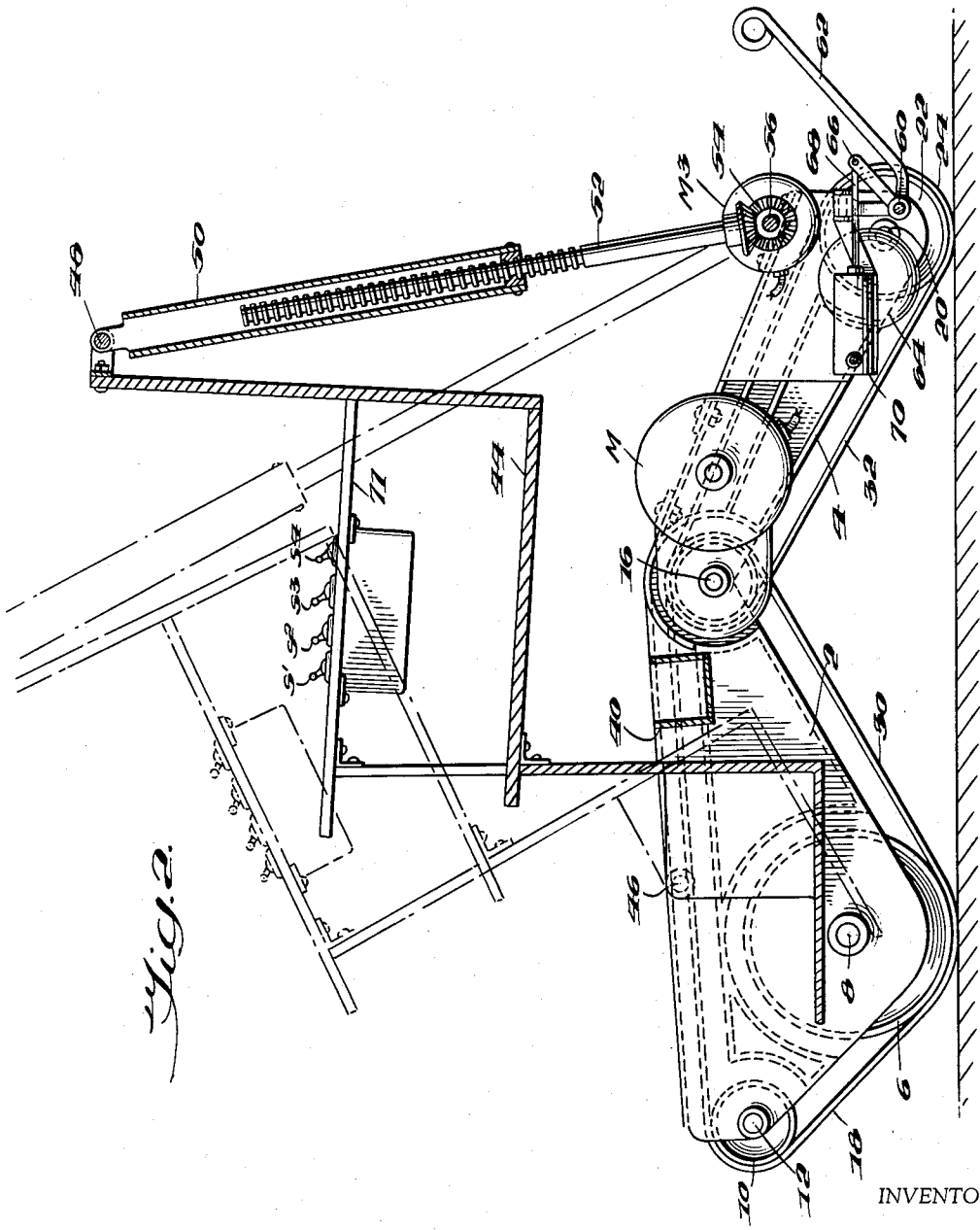

Fig. 2.

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Fig. 3.

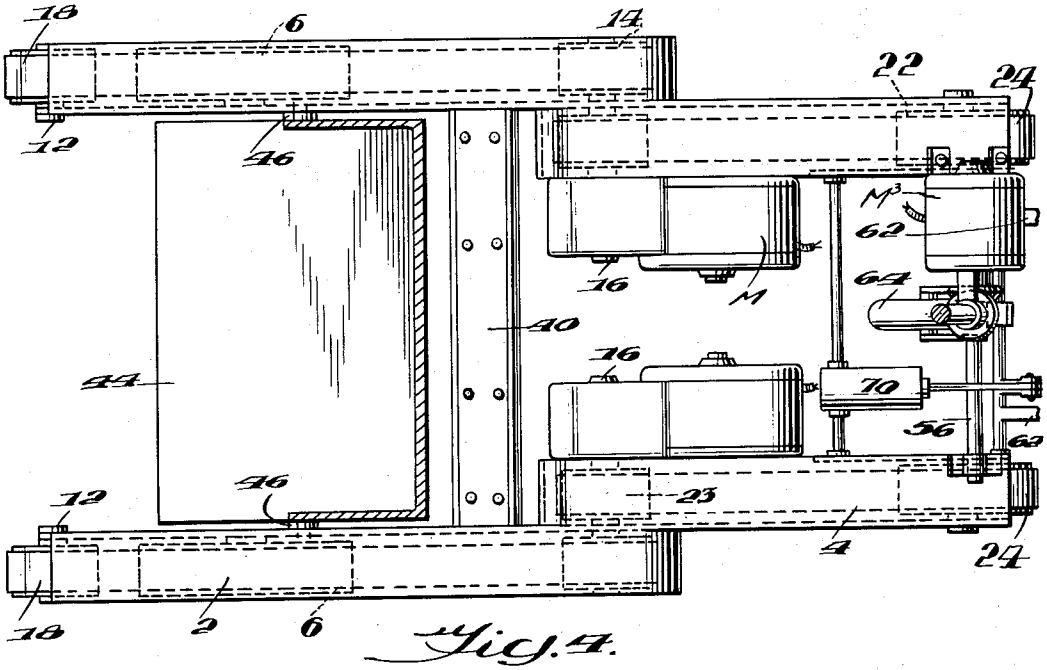

Fig. 4.

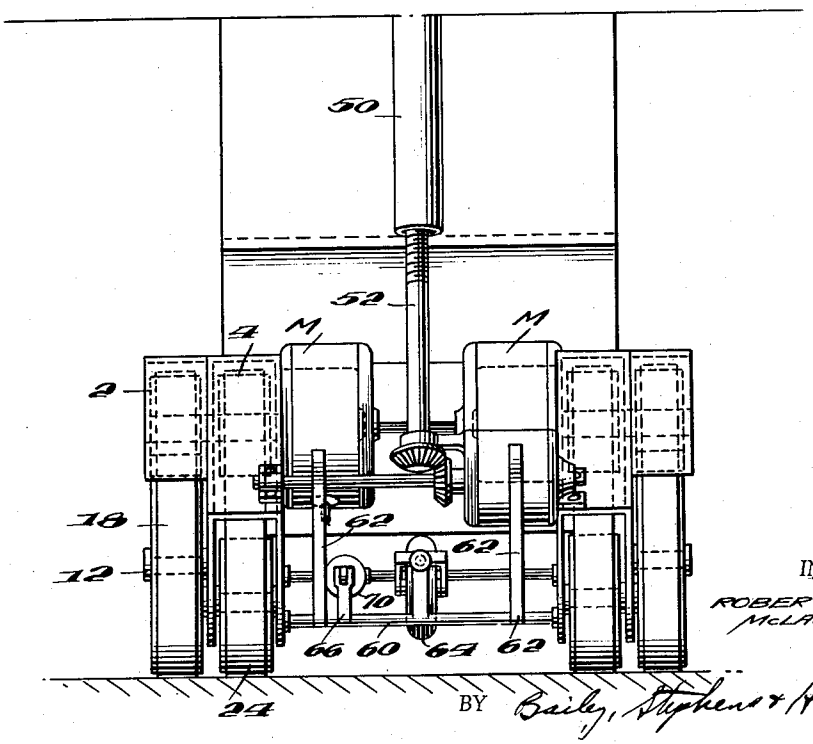

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Fig. 5.

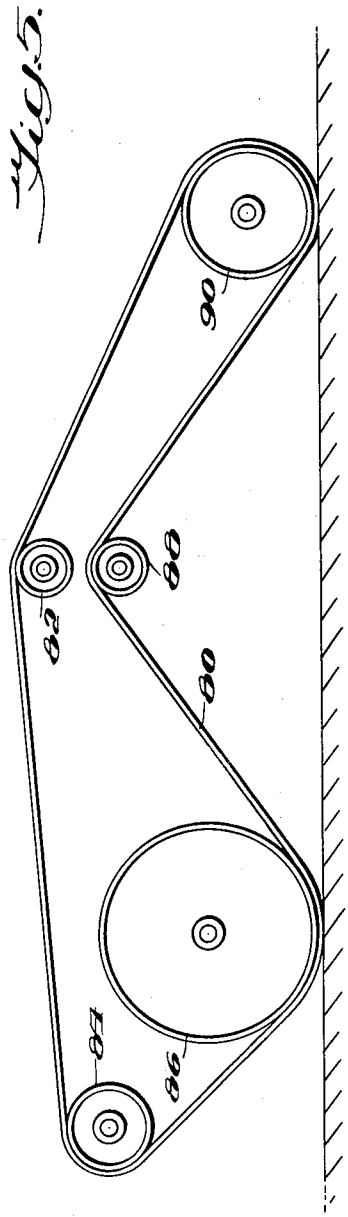
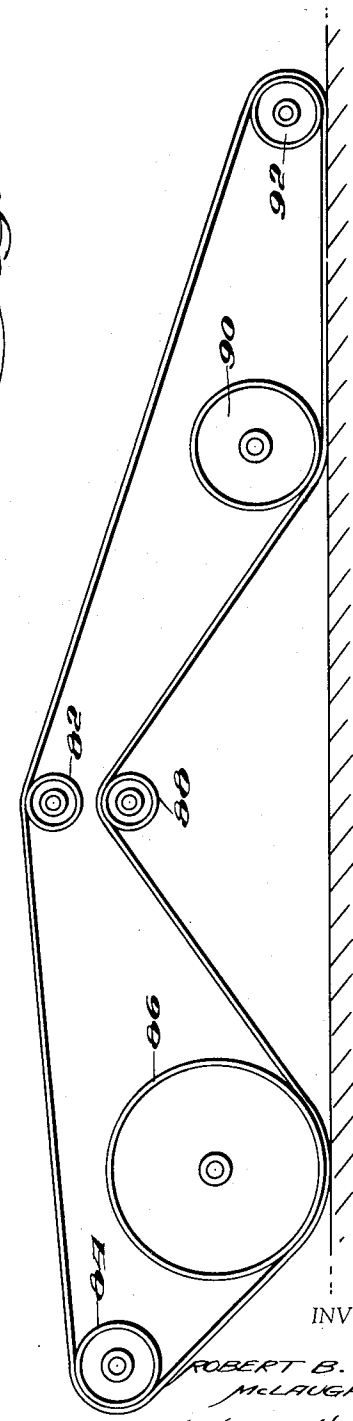


Fig. 6.



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United States Patent Office 2,751,027 Patented June 19, 1956

2,751,027

ENDLESS TRACK SUPPORTED INVALID CHAIR

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Application May 19, 1952, Serial No. 288,715

10 Claims. (Cl. 180—9.1)

This invention is directed to vehicles such as invalid chairs. In particular the invention relates to a motored invalid chair capable of going over curbs, and ascending and descending stairs.

The desirability of self powered invalid chairs which will permit the rider to transport himself over obstacles such as curbs and stairs has led to the development of chairs having endless treads and also a so-called star wheeled construction. None of these chairs are practical for both obstacle climbing and level transport, and consequently have not come into popular use. The objects of the instant invention are to construct a power operated vehicle which can travel on level surfaces as well as over obstacles with a smooth motion, and with absolute safety and comfort to the person seated in the chair.

In general, these objects of the invention are accomplished by mounting the chair upon endless tracks, the track portion between the front and rear guide wheels being inclined from the horizontal into an inverted V-shape to provide track surfaces engageable with a plurality of levels of the ground. The chair itself is hinged to the frame carrying the tracks so that it can be maintained in a substantially level, or slightly inclined position regardless of whether the chair is ascending or descending an obstacle. A safety feature exists in that the angle between the track portions is such that at least one track portion is always firmly engaged with the surface over which the chair is traveling, there thus being always positive drive and control of the chair, with the person seated in the chair having a full sense of control and security. No slippage or excessive tilting can take place. Electric motors provide the power for operating the chair.

The means by which the objects of the invention are obtained are described more fully with respect to the accompanying drawings, in which:

Figure 1 is a side elevational view of the chair;

Figure 2 is a vertical cross-sectional view through the chair;

Figure 3 is a horizontal cross-sectional view through the chair above the seat thereon;

Figure 4 is a rear elevational view of the chair;

Figure 5 is a side elevational view of a modified form of tread for the chair;

Figure 6 is a side elevational view of a further modified form of tread for the chair;

Figure 7 is a diagrammatic view showing the chair ascending stairs, and

Figure 8 is a diagrammatic view showing the chair descending stairs.

The chair is mounted between a pair of frames, around which the endless tracks extend. As the frames are similar, a description of one suffices for the other.

Each frame is composed of a front section **2**, and a rear section **4** rigidly connected together.

Front frame section **2** has the shape of a triangle with the apex downward. A large wheel **6** is connected to the frame by stub shaft **8**, and serves as the front

support for the chair. Front guide or idler wheel **10** is journaled on stub shaft **12**. Drive wheel **14** is mounted on shaft **16**. An endless track **18** extends over and around wheels **6**, **10** and **14**.

Rear frame section **4** is of a somewhat rectangular shape and laterally offset from the front frame section. It carries a stub shaft **20** upon which is mounted rear supporting wheel **22**. A drive wheel **23** is mounted in the forward end of this section, said wheel **23** being fixed to drive shaft **16**. Endless track **24** extends over and around wheels **22** and **23**. A motor M is geared to drive shaft **16**, it being noted that there are two motors, one for each side of the chair.

Power is supplied through batteries housed in a cross-bracing channel member **40**. When the motors are energized, the tracks can be set in operation for either forward or rearward travel. Inasmuch as the front and rear tracks all pass over a pair of drive shafts **16** axially aligned, the track portions **30** and **32**, respectively, between the front and rear wheels rise in the form of a V, the apex being adjacent the axis of shafts **16**. This construction permits those portions of the tracks running along the legs of the V to function as driving treads as the vehicle is going over an obstacle such as a curb, or a flight of stairs.

The chair **44** is hung on pivots **46** adjacent the upper edge of the forward portion of the respective right and left frames. The chair is further secured to a pivot **48** at the upper edge of the back, this pivot also connecting the chair to a tube **50** having a rod **52** telescopically threaded therein. The lower end of the rod is connected to a bevel gear **54** oscillatable on a shaft **56**, and driven by motor M^3. When motor M^3 is energized, the chair will be tilted on a pivot **46** by the movement of the rod **52** in tube **50**.

For ease of movement, and for purposes of safety, a shaft **60** extends across the rear end of the frame and to which a pair of let-down safety bars **62** and a caster wheel **64** are securely and fixedly attached. The shaft **60** is connected by a crank **66** and rod **68** to a solenoid **70**. When the solenoid is actuated to move the rod **68** to the left in Figure 2, the caster wheel **64** will be lowered into contact with the ground, and will raise the rear end of the wheel chair, the wheels with their associated tracks **24** being lifted from the ground. Also safety bars **62** will be rotated counterclockwise out of position. This means that for traveling on a level surface, greater mobility is achieved by means of the caster wheel **64**. In reverse operation, when rod **68** is extended to the right in Figure 2, the caster wheel **64** is retracted, and safety bar **62** lowered to the position shown. In this position they will prevent the chair from tipping over backwards should an ascent reach too great an inclination.

The manuverability of the chair is insured by the use of four micro switches which are mounted on the arm **71** of the chair. Switches S^1 and S^2, respectively control motors M, thus giving full control over the tracks on either side of the chair. Switch S^3 controls motor M^3 so that the tilt of the chair can be regulated, while switch S^4 controls solenoid **70** so that the caster and safety bar can be operated.

While separate tracks are shown for the front and rear of the machine, it is not necessary that these be used, but may be as shown in Figures 5 and 6. In Figure 5 the belt **80** continues from front to rear, running over a drive roller **82**, front wheels **84** and **86**, idler **88** and rear wheel **90**. In Figure 6 a modified arrangement pertains, with the addition of a second rear wheel idler **92** located rearwardly of wheel **90**. This latter construction has the advantage of a more secure engagement of the rearward part of the track with the ground. In either of

the modifications of Figures 5 and 6, the safety bars **62** illustrated in Figures 1 and 2, as well as the caster wheel, should be used.

The mode of operation in ascending or descending a curb or stairs is diagrammatically shown in Figures 7 and 8. In ascending stairs, Figure 7, the front track engages the forward edge of the step and pulls itself upwardly until the front wheel **6** settles on the level, whereupon the front portion of the tread begins to engage the next upper edge of the step. As the chair travels forwardly, it will reach an angle at which the leg portion **30** of the V-shaped opening beneath the middle of the chair will horizontally engage the upper surface of the topmost level plane, while the rear wheel approaches the first step, and climbs over in the same manner as the front wheel. As the inclination begins, the switch operating motor M^3 is actuated in order to adjust the chair so that the seat remains substantially horizontal.

When the chair descends, Figure 8, the front wheel glides over the upper edge of the step, with the track portion **30** along the leg of the V keeping engaged with the edge of the step to prevent the chair from falling downward with a bump. At the same time, motor M^3 is energized to bring the seat of the chair into a substantially horizontal position. The chair then continues on downwardly with the front track constantly holding the chair from undue slippage until the portion of the track between front wheel **6** and idler **10** engages the lower level plane. When the front wheel is two steps below the rear wheel, the leg **32** of the V-shaped portion of the rear track is horizontal and becomes a supporting track surface for the chair. As the rear wheel travels over the edge of the step it will be prevented from falling with a bump by reason of the engagement of the forward portion of the front tread. It is noted that the let-down bars **62** are located at such an angle as to not interfere with the downward descent of the angle of a normal flight of steps.

Having now disclosed the means by which the objects of the invention are obtained, I claim:

1. A vehicle comprising a pair of laterally spaced non-articulate side frames, front and rear wheels mounted upon said frames, and endless ground engaging tracks extending over said wheels with the lower portion of each track and of each frame between the front and rear wheels upwardly inclined to form a V-shaped track section and V-shaped frame.

2. A vehicle as in claim 1, further comprising a body pivotally suspended between said frames, and means for rotating said body on its pivots for adjusting the angular relationship between said body and said frames.

3. A vehicle as in claim 1, each frame comprising a front section, a first track extending around said front section, a rear section, and a track extending around said rear section.

4. A vehicle as in claim 3, said front and rear sections being laterally offset from each other.

5. A vehicle as in claim 1, a drive shaft mounted on each frame at approximately the apex of said V-shaped section, driving wheels on said shaft, and said tracks extending over said drive wheels.

6. A vehicle as in claim 1, said tracks being continuous between said front and rear wheels.

7. A vehicle as in claim 1, further comprising a caster wheel, means mounting said caster wheel between the rear wheels on said pair of frames, and means for raising and lowering said caster wheel.

8. A vehicle as in claim 1, further comprising an anti-tip safety bar, and means mounting said bar for extension rearwardly of the rear wheels of said frames.

9. A vehicle as in claim 1, each frame comprising a front triangular section and a rear section.

10. A vehicle as in claim 1, further comprising idler wheels rearwardly of said rear wheels, and said tracks being continuous over said front, rear, and idler wheels.

References Cited in the file of this patent

UNITED STATES PATENTS

1,036,117	Holman	Aug. 20, 1912
1,443,619	De Virel	Jan. 30, 1923
1,953,563	Martinage	Apr. 3, 1934
2,319,008	McCormack	May 11, 1943
2,592,023	Gleason	Apr. 8, 1952

FOREIGN PATENTS

980,237	France	Dec. 20, 1950