Oct. 20, 1931. L. MARX 1,828,288

TOY

Filed Feb. 4, 1930

Fig. 1.

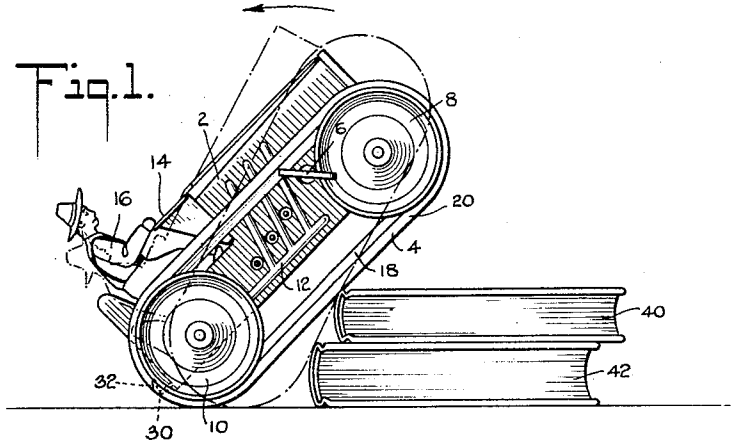


Fig. 2.

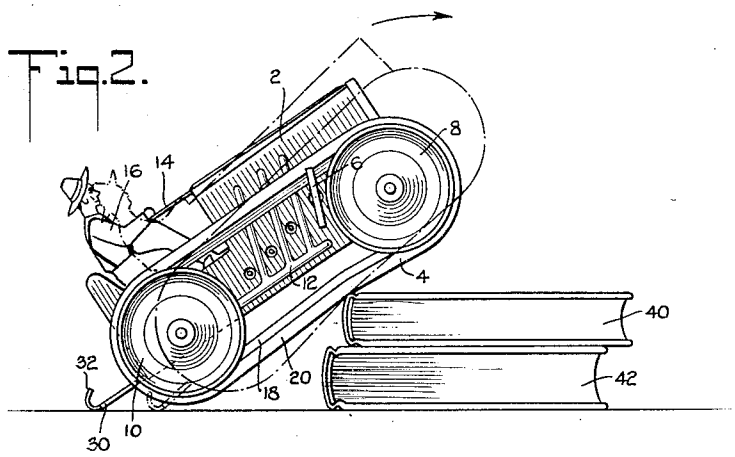
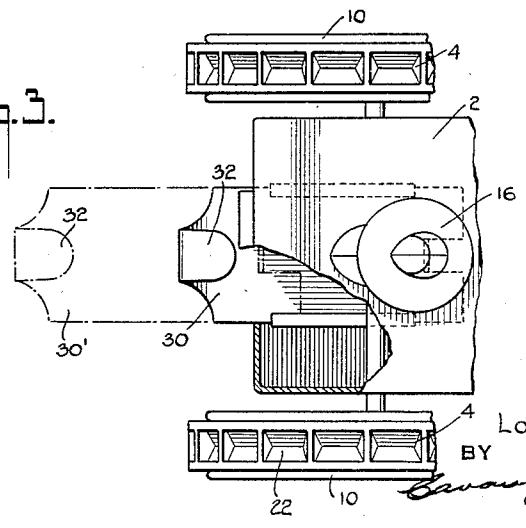


Fig. 3.



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UNITED STATES PATENT OFFICE

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TOY

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This invention relates to toys, and more particularly to toys of the track laying or caterpillar type.

Toys of the track laying or caterpillar type have attained considerable popularity because of their ability to climb over obstacles set in their path. If the obstacle is quite steep the toy is apt to turn over backward, thereby terminating its previously impressive performance in an ignominious manner. This tendency of the toy to upset is far more marked than might be anticipated from superficial consideration, and this effect I have found is due to the fact that the reaction of the driving torque of the rear portion of the tread of the toy is in such a direction as to tend to turn the toy over backward. In consequence, when the toy is climbing an obstacle, even if the obstacle is not sufficiently steep to place the toy in a position of unstable equilibrium, it may be sufficiently steep to give the rear portion of the tread considerable local traction, and this not only tends to move the rear of the vehicle toward the obstacle, thereby increasing the angle of lift of the vehicle, but also causes a torque of reaction which directly tends to and usually succeeds in upsetting the toy.

The primary object of the present invention is to overcome the foregoing difficulty, and to make toys of the track laying or caterpillar type more stable in operation and more efficient in negotiating relatively steep obstacles. Another object is to enhance the play value of the toy by making possible either stable or unstable operation at will.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, my invention resides in the method and the tractor elements and their relation one to the other, as hereinafter more particularly described and sought to be defined in the claims; reference being had to the accompanying drawings which show the preferred embodiment of my invention, and in which:

Fig. 1 is an elevation illustrating how a tractor toy of the prior art upsets;

Fig. 2 is an elevation of my improved tractor toy successfully negotiating the same obstacle; and

Fig. 3 is a partially sectioned view in plan of the rear portion of the tractor toy embodying my invention.

Referring to the drawings, my invention is illustrated as applied to a toy tractor of the track laying or caterpillar type, this tractor comprising a body 2, caterpillar tread 4, and driving means here exemplified by a spring motor energized by means of a winding key 6, the motor being suitably geared to either or both of pairs of driving wheels 8 and 10 on which the treads 4 are mounted. The toy may, if desired, be further provided with projections 12 simulating engine exhaust pipes, and means 14 simulating steering and control mechanism for the toy, as well as an operator 16 apparently handling the controls. The caterpillar treads 4 may be made of rubber and preferably consist of a V-shaped inner portion 18 and a parallel sided outer portion 20, and are further preferably provided with suction cups or indentations 22 on the outer periphery thereof.

The tractor toy as so far described is more or less conventional. However, in addition to the aforesaid elements I provide means at the rear of the toy to prevent it from turning over when climbing a relatively steep obstacle. This means is here illustrated simply as a trail 30 when is preferably reciprocably mounted at the rear of the body of the vehicle, so that it may be adjusted between the positions 30 and 30′ shown in Fig. 3. When the trail 30 is moved entirely into the body it does not project beyond the periphery of the treads 4, and therefore is of no effect. In the position 30 the trail is inoperative, and hence the toy may be readily caused to upset, whereas in the position 30′, the exact location of which is adjustable for best results, the trail is operative, and the toy will not upset. The play value of the toy is greatly enhanced by having optionally available either type of operation.

The difficulty with prior toys of this nature will be described with reference to Fig. 1 in which the tractor, although fitted with the trail 30, may be considered as not having the same, inasmuch as the trail 30 has been adjusted to its innermost position. The toy,

on reaching a suitable obstacle here represented by a stacked pair of books 40 and 42, begins to climb over the same until it reaches a position as shown in solid lines in Fig. 1. If the obstacle is sufficiently steep to bring the tractor to this position, it is very apt to turn over backwards because of a number of cooperating factors. In the first place, there is considerable traction at the rear portion of the treads 4, and this causes the tractor to ride in against the obstacle to as steep an elevation as is possible, this position being illustrated by the broken line position in Fig. 1. When the rear portion of the tread can no longer ride forward, the reaction of the movement of the tread against the body of the vehicle begins to be felt. This reaction may best be understood by considering the forces centering about the rear wheels 10 of the vehicle. These wheels tend to turn forward, and by reaction therefore tend to swing the body of the vehicle backward in the direction of the arrow about the axis of wheels 10 as a pivot. The driving torque of the toy being relatively powerful, the toy is easily turned backward the slight additional amount needed to change its equilibrium and thus to upset the toy.

Referring now to Fig. 2, the same toy is illustrated as negotiating the same obstacle, the toy being altered merely by readjusting the position of the trail 30 to project from the rear of the body of the vehicle. More broadly, we may consider the toy as having been altered by having the body thereof differently shaped, so that a portion of the body is properly positioned to press against the ground when the vehicle attempts to negotiate a steep obstacle.

The theory of operation of the improved tractor may be explained from several viewpoints. In the first place, the trail prevents the vehicle from ever lifting upward to so steep an angle as to place the toy in unstable equilibrium. In the second place, the trail effectively lengthens the wheel base of the toy when the toy is climbing an obstacle, so that, as is clearly evident in Fig. 2, the toy is permitted to surmount the obstacle while inclined at less an angle of elevation than would be possible in the absence of the trail 30. In the third place, and perhaps most importantly, the trail 30, upon reaching the ground, relieves the traction of the rear portion of the tread 4. Thus, in Fig. 2 the wheel 10 and the tread 4 thereon are lifted entirely clear of the ground. This obviates the tendency of the rear portion of the toy to climb in as closely as possible to the obstacle, as was explained in Fig. 1, and further obviates the force of reaction at the rear portion of the tread which tends to rotate the toy backward about the axis of rear wheel 10. In other words, by relieving the traction of the rear portion of the tread, the only traction remaining is that at the forward portion of the tread, and the tractive effort applied at the forward portion of the tread tends to draw the vehicle up over the obstacle and to rotate the vehicle clockwise or downwardly, as is indicated by the arrow.

The trail 30 may, if desired, be fitted with a small wheel or roller so as to reduce the friction or braking action thereof, or it may, as has here been shown, simply consist of a rounded skid. In the present case, the rear end of the trail 30 is suitably formed and bent upward to obtain a hook 32 which may be used for towing purposes. The trail 30 is reciprocably or slidably mounted in the body so that it need not be projected, and if projected, so that its projection may be adjusted to best suit the steepness of the obstacle to be surmounted. This adjustability should, of course, be with sufficient friction to permit of the hook 32 taking the tractive pull of the vehicle without being pulled out of the desired position or adjustment.

From the theory of operation of the toy as previously outlined, it will be understood that the toy can not upset even if the obstacle is so steep that it can not be surmounted thereby. The corner of the book 40, for example, if too slippery, will permit the tread 4 to slide thereon, and for successful operation the obstacle should therefore have a rough rather than a smooth surface. A straight incline having a relatively rough surface may be negotiated to even better advantage than the obstacle illustrated in the drawing, because of the greater surface upon which the forward portion of the tread may grip.

It will be apparent that while I have shown and described my invention in the preferred form, many changes and modifications may be made in the structure disclosed without departing from the spirit of the invention, defined in the following claims.

I claim:

1. A tractor toy comprising a body, a pair of caterpillar treads, wheels on which said treads are mounted, driving means in said body for rotating said wheels and treads, and a trail reciprocably mounted at the rear of the body of the toy and adjustable to bear upon the ground as the toy reaches any desired angle when attempting to climb a relatively steep obstacle, so that said trail will prevent the toy from lifting further to a more unstable angle, and will prevent the toy from turning over backward, said trail also being movable to an inoperative position, permitting the toy to turn over backward.

2. A tractor toy comprising a body, a pair of caterpillar treads, wheels on which said treads are mounted, driving means in said body for rotating said wheels and treads, and a trail reciprocably mounted at the rear of the body of the toy and adjustable between

an inoperative position permitting the toy to turn over backward when climbing a steep obstacle, and an operative position preventing the toy from turning over backward when climbing a steep obstacle.

Signed at New York, in the county of New York and State of New York, this 3rd day of February, A. D. 1930.

LOUIS MARX.