Dec. 6, 1927. 1,651,583

E. A. CALLESON

HAND PROPELLED TOY VEHICLE

Filed March 10, 1927 3 Sheets-Sheet 1

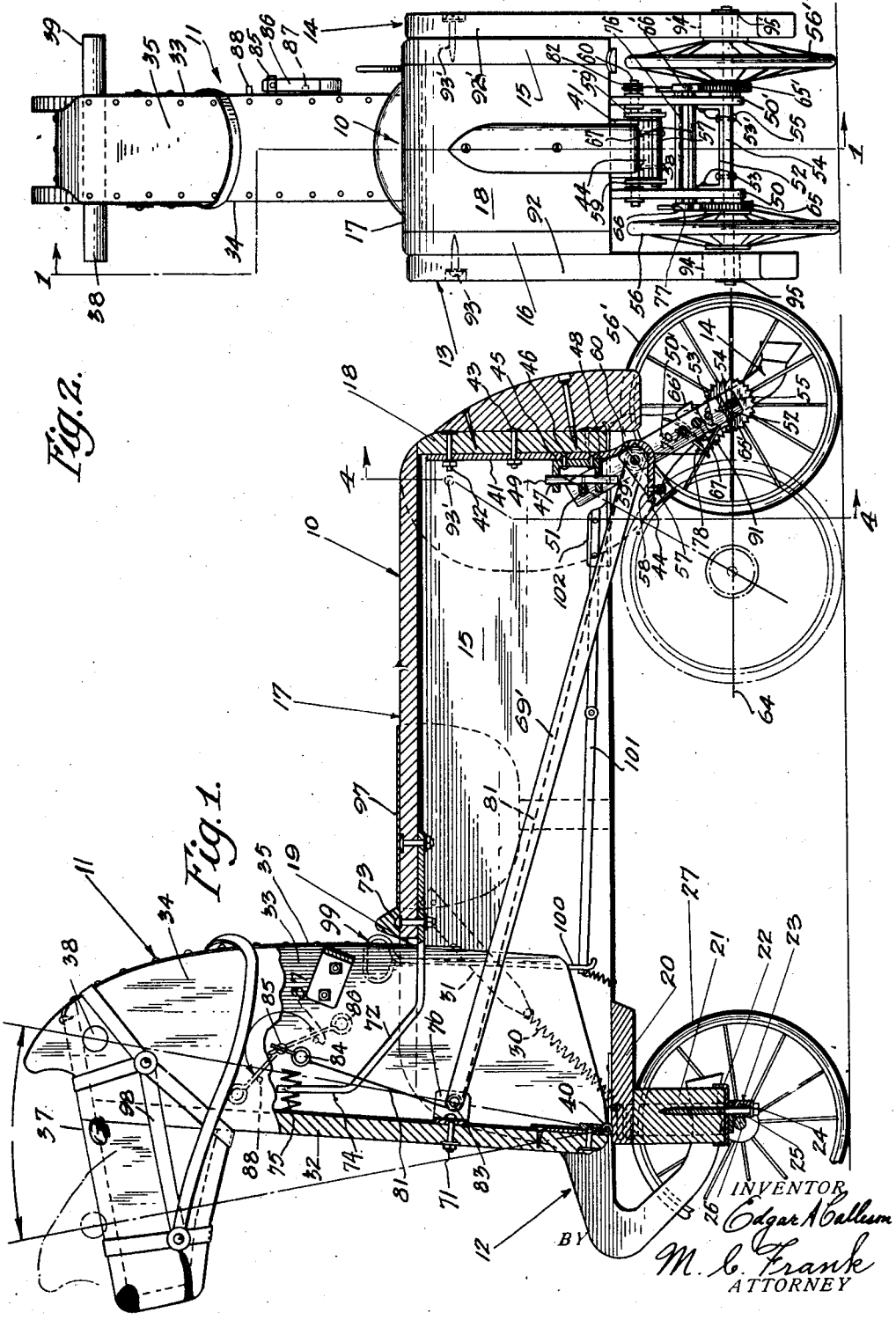


Fig. 2.

Fig. 1.

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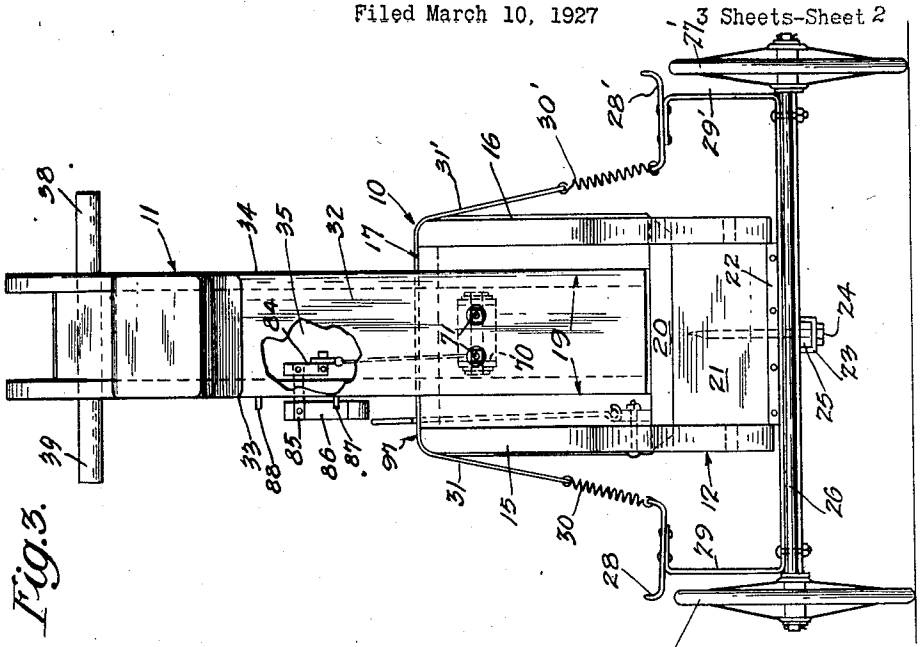


Fig. 3.

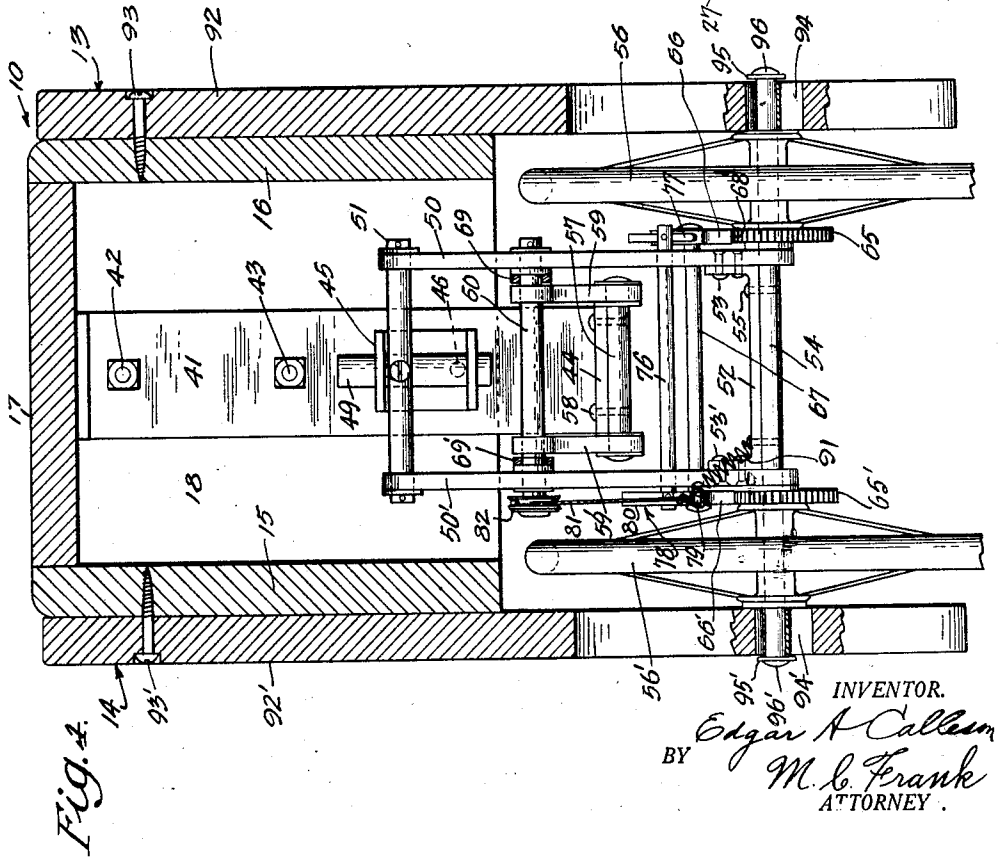


Fig. 4.

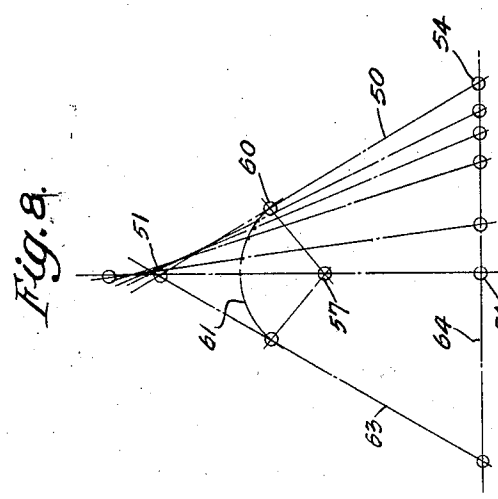
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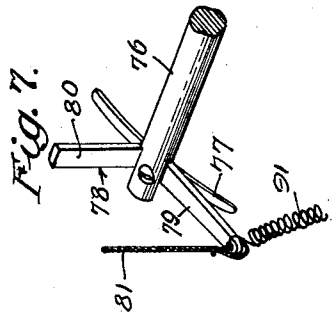
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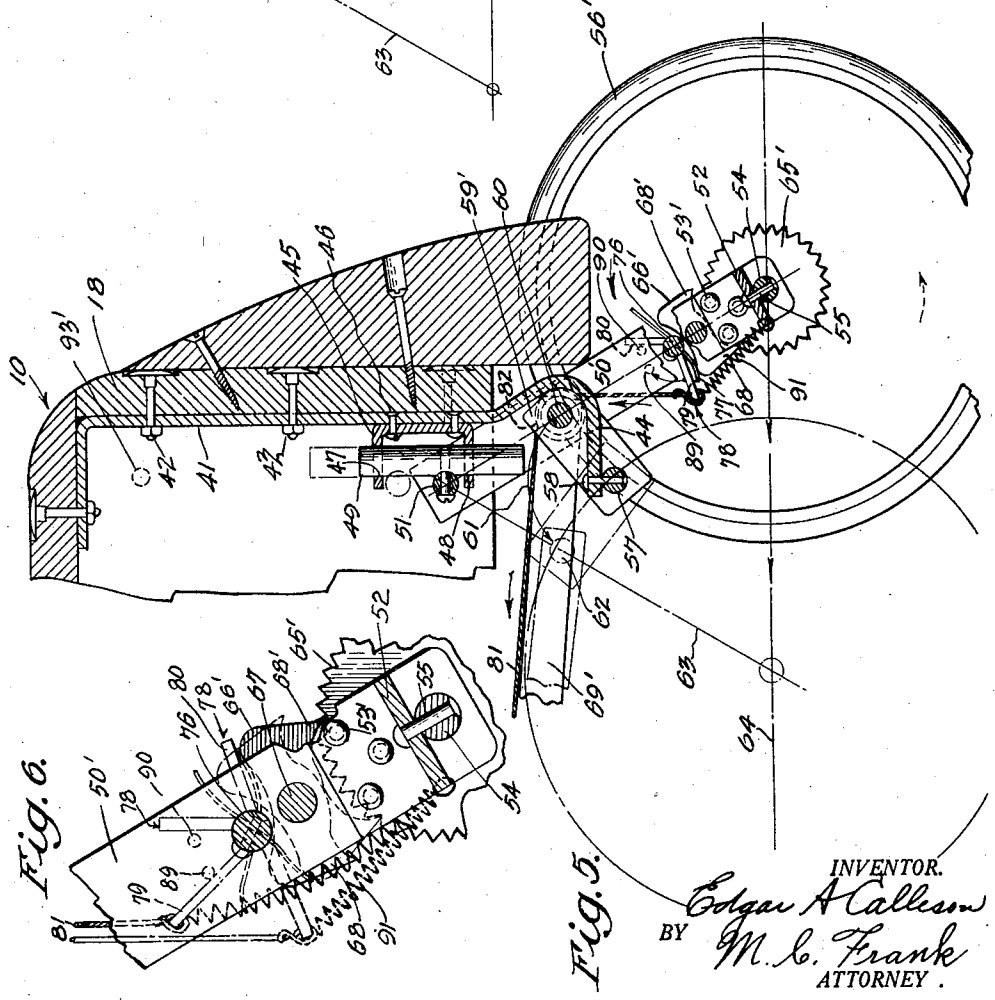
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HAND PROPELLED TOY VEHICLE

Filed March 10, 1927 3 Sheets-Sheet 3







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UNITED STATES PATENT OFFICE.

EDGAR A. CALLESON, OF OAKLAND, CALIFORNIA.

HAND-PROPELLED TOY VEHICLE.

Application filed March 10, 1927. Serial No. 174,211.

This invention relates to improvements in toy vehicles generally, and in particular to a toy vehicle which utilizes an operating handle adapted to transmit driving power through an oscillatory movement of the handle, and in which the rear driving construction embodies a lever and ratchet gear mechanism adapted to function to normally transmit a progressive straight line forward idling and rearward thrusting movement to the rear wheels of the vehicle, to propel the vehicle over the ground.

I am aware that ratchet and lever mechanisms have been utilized in various combinations to propel toy vehicles, but none of them, to my knowledge, have utilized a similar rear construction as that embodied in my present invention, in which the rear wheels of the vehicle are carried by levers acting in unison and adapted to propel the vehicle by the transmission of an oscillatory motion transmitted to said levers, which oscillatory motion is converted thereby into a straight line forward idling and rearward thrusting movement; the ratchets normally functioning to cause the rear wheels to idle on the forward stroke of the levers and to lock on the rearward stroke thereof, which causes the vehicle to be propelled forwardly, or rearwardly if desired, by changing the positions of the ratchets by means of a reversing mechanism associated therewith.

The primary object of the present invention is the provision of a toy vehicle embodying a driving mechanism, including lever and ratchet combinations that normally function to transmit to the rear driving wheels a progressive straight line forward idling and rearward thrusting movement, or upon reversal of the driving mechanism, causes said mechanism to transmit a rearward idling and forward thrusting movement to drive the vehicle in the reverse direction.

An important object of my invention is the provision of a toy vehicle having a body symbolical of an animal, such as a horse, in which the rear legs of the animal are arranged to follow the swinging movements of the rear levers in simulation of the leg movements of a horse, as in galloping.

Another object of the invention is to provide a toy vehicle of the type designated which includes in its driving mechanism a shift-lever mechanism adapted to cause said driving mechanism to drive the vehicle in either a forward or rearward direction, or to assume a neutral position which allows said driving mechanism to idle and causes the vehicle to idle, or coast.

An additional object of the invention is to provide a toy vehicle which is novel in design, durable, and that is of comparatively inexpensive construction.

Other objects and advantages of the invention will be apparent with reference to the subjoined specification and accompanying three sheets of drawings, in which:

Figure 1 is a longitudinal sectional view of my improved toy vehicle showing the lever and link combinations and ratchet mechanisms which, combined as a whole, form the driving mechanism of the vehicle; the dot-and-dash position of the rear wheels indicating the extreme forward thrust thereof when in operation, the body of the vehicle shown being symbolic of a horse, the head and neck portions thereof forming the operating lever of the device, and the section being indicated by line 1—1 of Figure 2.

Figure 2 is a rear elevation showing the body portion and rear driving mechanism of the device;

Figure 3 is a front elevation showing the front-axle construction and steering mechanism of the vehicle, a portion being broken away to illustrate the forward and reverse control lever;

Figure 4 is an enlarged sectional view of the rear end construction showing the method of mounting the wheels and levers in the rear end of the body, the section being indicated by the line 4—4 of Figure 1;

Figure 5 is an enlarged sectional detail of the extreme rear end of the body portion of the vehicle showing the rear lever construction and mounting, also the ratchet mechanisms and reversing gear, the dot-and-dash position of the wheels indicating the extreme forward stroke of the rear levers;

Figure 6 is a greatly enlarged sectional detail of the rear axle and the right-hand ratchet showing the reversing gear in detail;

Figure 7 is a perspective detail of the reversing gear rock-shaft and bell-crank lever; and

Figure 8 is a diagrammatic view illustrating the progressive straight line movement of the rear axle and wheels.

In the drawings, in which the preferred embodiment of my invention has been shown, the main portion of the vehicle rep-

resents the body of a horse and comprises the body portion 10, neck and head section 11, rigid fore legs 12 and pivotal hind legs 13 and 14.

The body portion 10 is of rectangular form and consists of the sides 15 and 16, top side 17, and rear end closure 18. The front end 19 of the body is open and provides a space in which the neck section 11 is adapted to oscillate. The under forward edges of the sides 15 and 16 are provided with a transverse brace 20, which carries a block 21 and to the underside of which is secured a U-shaped bracket 22 and a clip 23, through which the king-bolt 24 extends. The clip 23 is secured to the block 21 and a member 25 is secured centrally to the front axle 26 and is provided with an opening through which the king-bolt is inserted. The axle 26 is carried by the front steering wheels 27 and 27′ and these wheels are manipulated by means of rigidly mounted stirrups 28 and 28′ carried by upstanding brackets 29 and 29′ rigidly bolted to the front axle 26, as shown in Figure 3.

A pair of equalizing springs 30 and 30′ are secured to the body sides 15 and 16 by means of straps 31 and 31′, these tending to hold the front wheels in a straight line but free for steering purposes through the medium of the rider's feet which normally rest in the stirrups 28 and 28′.

The neck portion 11 of the vehicle consists of a hollow member formed by the front section 32, sides 33 and 34, and rear curved metal section 35, upon the upper end of which is formed the head 37 and operating grips 38 and 39.

The neck portion 11 as a whole forms the operating lever of the vehicle, and the lower edge of the section 32 is securely hinged to the cross brace 20 by a hinge member 40, and is adapted for oscillation upon the hinge pintle thereof.

The rear closure 18 of the body of the vehicle is provided with a centrally-positioned metal brace 41, Figures 1, 4 and 5, which is securely bolted in place by bolts 42 and 43 and extends below the lower edge of said closure and is curved inwardly and terminates in a horizontal support 44.

A U-shaped clip 45 is riveted to the inner face of the brace 41 by rivets 46 and is positioned thereon slightly above the lower edge of the end closure 18. The horizontal members of this clip are provided with vertically-aligned openings 47 and 48 which provide bearings for a vertically-movable shaft 49, Figures 4 and 6.

The rear actuating levers 50 and 50′ are arranged in parallel relation, as shown in Figure 4, and are spaced apart as shown in said figure, with their upper ends pivotally secured to the horizontally disposed shaft 51 which in turn is rigidly bolted to the vertically disposed shaft 49, the said shaft 51 tending to move vertically with the shaft 49 and to carry the upper ends of the levers 50 and 50′ therewith as hereinafter described.

The levers 50 and 50′ are normally inclined rearwardly, as shown in Figures 1 and 5, and are provided near their lower extremities with a rigid brace 52 riveted to opposite levers by rivets 53 and 53′. The lower ends of said levers are provided with openings through which the rear axle 54 extends, said axle being rigidly riveted to the brace 52 by rivets 55, as shown in Figures 4, 5 and 6, and carry the rear driving wheels 56 and 56′.

The forward underside of the support 44 is provided with a horizontally-disposed shaft 57, which is rigidly riveted to said support 44 by means of rivets 58 and carries at its outer ends a pair of short links 59 and 59′, normally inclined toward the levers 50 and 50′ and pivotally secured thereto by a horizontally-disposed shaft 60, said shaft 60 being adapted to normally rest in the curved portion of the brace 41, as shown in Figure 5, and is adapted to travel in an arcuate path 61 to the dot-and-dash position 62 which is the limit of its forward thrust, and carries with it the actuating levers 50 and 50′ to the dot-and-dash line 63.

The shaft 51 carries the upper ends of levers 50 and 50′ and moves vertically with the vertically-disposed shaft 49, and this vertical movement compensates for the arcuate swing of the shaft 60, as carried by the levers and links 59 and 59′; thus causing the rear axle 54 to move in a straight line 64 to the extreme forward limit of the throw of said levers 50 and 50′ and to cause the rear wheels 56 and 56′ to thrust forwardly to the dotted position shown in the figure.

The rear wheels 56 and 56′ are each provided with a ratchet gear 65 and 65′ which are secured in any suitable manner to the inner flanges of the hubs, and are concentrically mounted upon the rear axle 54, said ratchets are positioned immediately adjacent the outer sides of the levers 50 and 50′ and are each adapted to be engaged by pawls 66 and 66′ arranged upon outer extremities of a shaft 67, which is headed at its outer ends to prevent their displacement and to cause their united action in reversing the driving mechanism as hereinafter explained.

The pawls 66 and 66′ are of duplicate construction and are each provided on their under edges with a pair of ratchet engaging teeth 68 and 68′ as shown in Figures 5 and 6. The forward tooth 68 of each pawl is positioned to engage the ratchet teeth of the ratchets 65 and 65′ to prevent their clockwise movement but to allow of their contra-clockwise movement, that is, the rear wheels will idle when the levers are thrust forwardly to the dotted line 63, but when said

levers are thrust rearwardly to their normal positions, the teeth 68 will grip the ratchet teeth and force the vehicle ahead.

When the teeth 68′ of the pawls 66 and 66′ are thrown into engagement with the ratchets, the same thrusting movement of the levers 50 and 50′ reverses the direction of travel of the vehicle.

The levers 50 and 50′ are each connected by links or connecting rods 69 and 69′ to a bracket 70 bolted to the inner side of the front section 32 of the neck portion of the vehicle by the bolts 71, said levers being secured to the shaft 60 between the levers 50 and 50′ and the links 59 and 59′, as shown in Figure 4.

A bar 72 is bolted to the underside of the top 17 of the vehicle by bolts 73 and terminates in an upstanding section 74 positioned adjacent the section 32, and said section is provided with a buffer spring 75 against which the section 32 bears when oscillated to its rearmost position, as shown in Figure 1.

The shifting gear consists of a shaft 76 extending through the levers 50 and 50′ immediately above the shaft 67 and provided, at its extremities, with leaf-springs 77 adapted to engage alternate upper edges of the pawls 66 and 66′ to hold said pawls in engagement with the teeth of their respective ratchets. The right-hand extremity of the shaft 76 is provided with a bell-crank member 78 having arms 79 and 80, the arm 79 being connected to a cord or wire 81 which is carried over a pulley 82 Fig. 5 mounted upon the outer end of the shaft 60, thence forwardly beside the lever 69′ to the pivot point 83 of said lever 69′, thence upwardly and is secured to a short lever 84 Fig. 3 mounted in a short rock-shaft 85, which is carried by one side of the neck portion of the vehicle. The outer end of said shaft is provided with a lever 86 adapted to swing from the pin 87 to the pin 88 as shown in Figure 1. The lower dotted position of said lever 86 is the position assumed when the pawls are positioned for forward movement, and the upper dotted position of said lever is that assumed when the pawls are in engagement for the rearward movement of the vehicle.

The lever 50′ is provided with a pair of stop pins 89 and 90, as shown in Figure 5, positioned on the outer side of said lever and are adapted to be alternately engaged by the arms 79 and 80 of the bell-crank lever 78 and tend to limit the movement of said lever in either direction; the spring 91 which is connected at one end to the arm 79 of the bell-crank and at its other end to the axle 54 tending to normally hold the pawl teeth 68 in engagement with the ratchets for the forward movement of the vehicle, as shown in Figures 1 and 5.

Figure 6 illustrates the position of the pawls when reversed by the upward swinging movement of the lever 86 until it contacts the pin 88, Figure 1. When said lever 86 is positioned intermediate said pins 87 and 88 the pawls are both out of mesh with the ratchet gears and the rear wheels will idle, as shown in dot-and-dash lines in Figure 6.

The rear legs 92 and 92′ of the body of the animal represented, are pivotally secured to the body sides 15 and 16 by screws 93 and 93′, and are provided with compensating slots 94 and 94′ which receive the outer ends of the rear axle 54 and are held in place for correlated action therewith by means of washers 95 and 95′, which are held in position by the headed ends 96 and 96′ formed on the extremities of said axle.

An imitation saddle 97 constructed of any suitable material may be mounted upon the top section 17 of the body, and the head of the animal may be provided with a bridle 98 as shown in Figure 1.

A brake mechanism 99 is mounted in the frame of the vehicle and consists of a pull rod 100, bar 101, and brake shoe 102 adapted to contact the peripheral surface of the rear wheel 56′, as shown in Figure 1.

In recapitulation:

It will be apparent with reference to Figures 1 and 5 of the drawings, and assuming that a child is seated upon the saddle 97 with his or her feet resting in the stirrups 28 and 28′, and with the hands grasping the grips 38 and 39, the pawls being positioned as shown in Figure 1, that should the neck section be oscillated away from the operator by the forward thrusting movement of said grips, the links 69 and 69′ will function to transmit this motion to the links 59 and 59′, and the levers 50 and 50′ carrying the rear wheels 56 and 56′ will be oscillated accordingly. The upper ends of the levers 50 and 50′ will be carried vertically by the compensating shafts 49 and 51, and the rear wheels will idle to the dot-and-dash position, Figure 1, and when the grips are pulled toward the operator the levers 50 and 50′ are thrust rearwardly to the limit of their rearward strokes, and the pawl and ratchet mechanisms then function to prevent rotation of the rear wheels in a clockwise direction, thus causing the vehicle body to be forced ahead. If this movement of the grips is repeated in quick succession it causes a continuous forward and rearward thrusting movement to be imparted to both levers and to the rear wheels and causes the consequent continued forward propulsion of the vehicle.

The reverse movement of the vehicle is readily accomplished by reversing the pawls as hereinbefore described.

From the foregoing description taken in connection with the accompanying draw-

ings, the advantages of the construction and method of operation will be readily understood by those skilled in the art to which the invention appertains, and while I have described the principle of operation, together with the device which I now consider to be the best embodiment thereof, I desire to have it understood that the device shown is merely illustrative and that such changes may be made, when desired, as fall within the scope of the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent of the United States, the following:

1. A hand-propelled toy vehicle comprising in combination, a frame, steering wheels carried by said frame, actuating levers mounted in said frame, driving wheels carried by said actuating levers, operating means mounted in said frame and connected to said actuating levers, means carried by said levers for locking the driving wheels thereto, and said operating means being adapted for oscillation to transmit an oscillating motion to said actuating levers to propel the vehicle.

2. A hand-propelled toy vehicle comprising in combination, a body forming a frame, steering wheels carried by said frame, actuating levers mounted in the rear end of said frame and having driving wheels mounted at their lower ends and adapted for unified action, oscillatory means mounted in the forward end of said frame and having link means connected to said actuating levers, ratchet means carried by said driving wheels and pawl means carried by said actuating levers, and shifting means associated with said pawls to cause their engagement or disengagement with said ratchets.

3. A hand-propelled toy vehicle comprising in combination, a body forming a supporting frame, steering wheels mounted on the front end of said frame, actuating levers mounted in the rear end of said frame, compensating means carried by the upper ends of said levers and driving wheels carried by the lower ends thereof and adapted for unified action, an operating lever mounted in the forward end of said frame and having link means connected thereto and to said actuating levers, ratchet means borne by said driving wheels, and pawl means carried by said actuating levers and coactively associated with said ratchet means, the said operating lever being adapted to impart an oscillatory motion to said actuating levers to cause said driving wheels to impart a forward thrusting movement to said vehicle.

4. A hand-propelled toy vehicle comprising in combination, a body forming a supporting frame, steering wheels mounted on the front end of said frame and having equalizing means tending to hold them in straight line positions, a brace carried by the rear end of said frame, actuating links pivotally mounted upon said brace, actuating levers pivotally secured to said links and having compensating means mounted at their upper ends tending to compensate for the arcuate swinging movement of the links, an axle borne by the lower ends of the actuating levers, driving wheels carried by said axle, pawls and ratchets carried respectively by said actuating levers and wheels, shifting means associated with said pawls for causing alternate ends thereof to engage said ratchets, and oscillatory means connected to said actuating links to cause the oscillation of the actuating levers to produce a straight line forward and rearward thrusting movement to said rear axle.

5. A hand-propelled toy vehicle comprising in combination, a body forming a supporting frame, steering wheels mounted on the front end of said frame and having equalizing means associated therewith, a brace carried by the rear end of said frame, actuating links pivotally mounted upon said brace, actuating levers arranged in parallelism and pivotally secured to said actuating links, compensating means coactively associated with said levers and links tending to compensate for the arcuate swinging movement of the links, an axle borne by the lower ends of the actuating levers, driving wheels carried by said axle, pawls and ratchets carried respectively by said actuating levers and wheels, spring means associated with said pawls tending to normally urge them into contact with said ratchets, shifting means for changing the positions of said pawls, and means associated with said actuating links to cause the oscillation of the actuating levers to produce a horizontal forward and rearward thrusting movement to said axle.

6. A hand-propelled toy vehicle comprising in combination, a body forming a supporting frame, said body being symbolical of an animal and having rigidly mounted fore legs and pivotally mounted rear legs, steering wheels mounted on the forward end of said frame, actuating levers carried by the rear end of the frame, actuating links pivotally mounted in the frame and in turn pivotally secured to said actuating levers, compensating means coactively associated with said actuating levers and links tending to compensate for the arcuate swinging movement of said links, an axle borne by said actuating levers and carrying the lower ends of said rear legs, driving wheels carried by said axle, pawls and ratchets carried respectively by said actuating levers and wheels, said pawls having oppositely arranged teeth adapted for engagement with opposite sides of said ratchets, shifting means for changing the positions of said

pawls relative to said ratchets, and means carried by said frame for oscillating said actuating links and levers to cause said rear wheels to idle in one direction and be locked against rotation in the opposite direction to propel said vehicle in a continuous direction.

7. A hand-propelled toy vehicle comprising in combination, a frame, steering wheels carried by said frame, actuating levers mounted, in the rear end of said frame, an axle carried by said actuating levers, actuating links coactively associated with said actuating levers, compensating means coactively associated with said actuating links and levers, pawls and ratchets carried respectively by said actuating levers and driving wheels and being adapted to allow the free rotation of said wheels in one direction and to lock the same against rotation in the opposite direction, and means for oscillating said actuating links.

8. A hand-propelled toy vehicle comprising in combination, a frame, steering wheels carried by said frame, actuating levers mounted in the rear end of said frame, an axle carried by said actuating levers, actuating links coactively associated with said actuating levers, compensating means coactively associated with said actuating links and levers, pawl and ratchet means carried respectively by said actuating levers and driving wheels and being adapted to allow the free rotation of said wheels in one direction and to lock the same against rotation in the opposite direction, shifting means associated with said pawl means to change the position thereof relative to said ratchet means, and means for oscillating said actuating links.

9. A hand-propelled toy vehicle comprising in combination, a frame, steering wheels carried by said frame, actuating levers mounted in the rear end of said frame, an axle carried by said actuating levers, actuating links coactively associated with said actuating levers, compensating means coactively associated with said actuating links and levers, pawls and ratchets carried respectively by said actuating levers and driving wheels and being adapted to allow the free rotation of said wheels in one direction and to lock the same against rotation in the opposite direction, shifting means associated with said pawls and being adapted to change their positions relative to said ratchets, spring means normally tending to hold said pawls in contact with their respective ratchets, and means for oscillating said actuating links.

10. In a hand-propelled toy vehicle, a driving mechanism therefor consisting of actuating levers mounted for oscillatory movement, an axle carried by said levers, actuating links associated with said levers, compensating means associated with said links and levers, driving wheels carried by the axle, pawls and ratchets carried respectively by said actuating levers and driving wheels, means for changing the positions of said ratchets, and means for oscillating said links and levers to transmit a straight line forward and rear thrusting movement to said axle.

11. In a hand-propelled toy vehicle, a driving mechanism therefor consisting of actuating levers mounted for oscillatory movement, an axle carried by said levers, actuating links associated with said levers, compensating means associated with said levers and links tending to compensate for the arcuate movement of said links, driving wheels carried by the axle, pawls and ratchets carried respectively by said actuating levers and driving wheels, said pawls being double-ended and adapted for alternate engagement with opposite sides of said ratchets, means for changing the positions of said pawls, and means for oscillating said links and levers to transmit a straight line forward and rearward thrusting movement to said axle.

In testimony whereof, I affix my signature.

EDGAR A. CALLESON.