

[54] COMPRESSED AIR PROPELLED TOY
VEHICLE AND LAUNCHING SYSTEM

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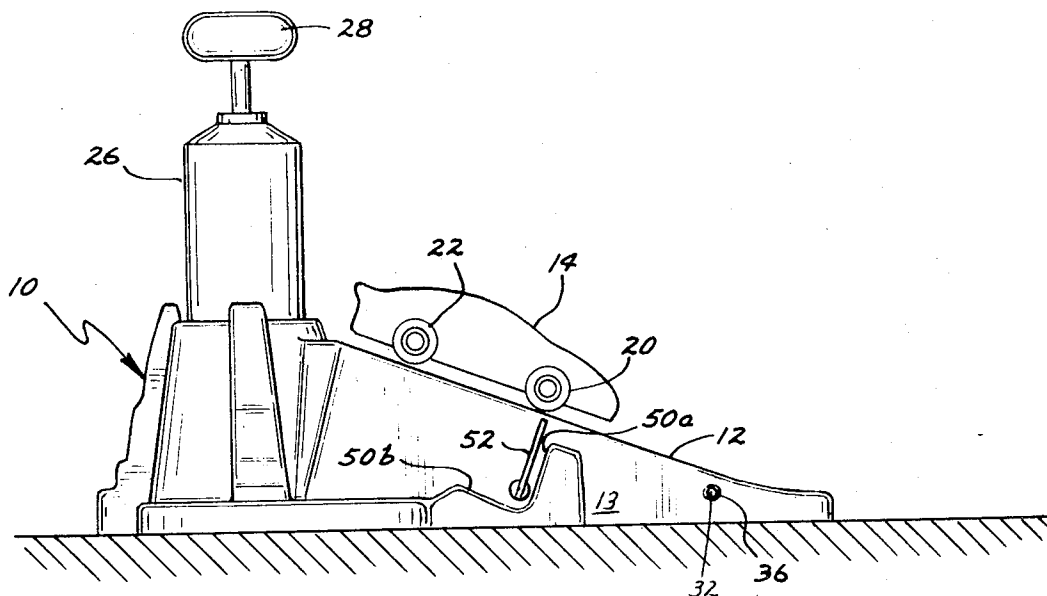
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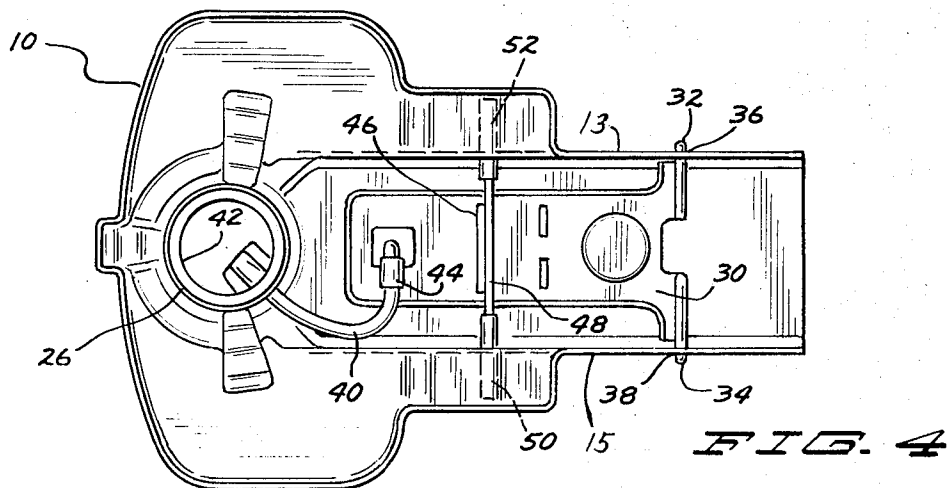
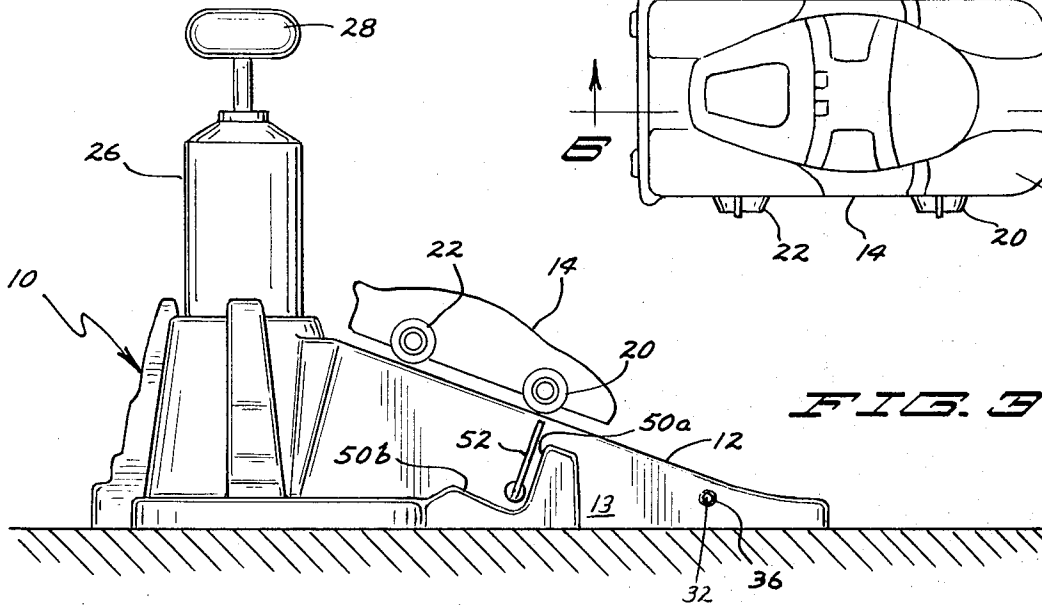
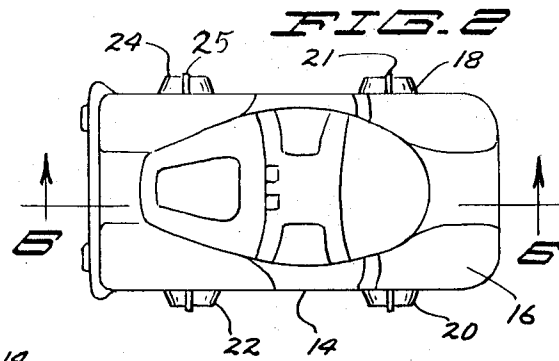
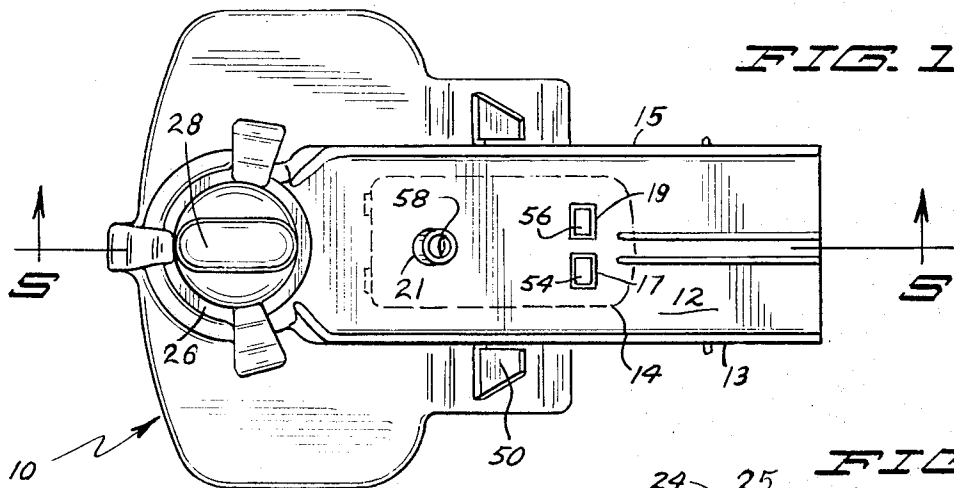
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ABSTRACT

A toy vehicle is provided with a motor. The motor has a turbine which is operated by compressed air. The motor is connected through a gear train to the driving wheel of the vehicle. A launching structure having an air pump, an air hose for connecting the air pump to the vehicle motor, and a latching system to hold the vehicle in place while air from the pump is directed at the turbine, and to release the vehicle when it is ready to go.

5 Claims, 6 Drawing Figures





COMPRESSED AIR PROPELLED TOY VEHICLE AND LAUNCHING SYSTEM

This invention relates to toys. More particularly, it pertains to a toy vehicle operated by compressed air and a launching structure used in conjunction with toy vehicles.

One object of this invention is to provide a toy vehicle which can be powered by compressed air.

Another object of this invention is to provide a novel launching structure for use with a toy vehicle to enable children to accelerate such toy vehicle and cause it to move.

Other objects and advantages of this invention will be apparent from the following description in which certain preferred embodiments of the invention are disclosed.

In the drawings which form a part of this application,

FIG. 1 is a top view illustrating one form of a launching structure of the present invention, with dash lines illustrating the position of a vehicle placed thereon,

FIG. 2 is a top view illustrating one form of a vehicle of the present invention,

FIG. 3 is a side view of the structure shown in FIG. 1 with the vehicle shown in FIG. 2 placed thereon,

FIG. 4 is a bottom view of the launching structure shown in FIG. 1,

FIG. 5 is a sectional view of the launching structure shown in FIG. 1 taken along the line 5-5 of FIG. 1 with the dash lines illustrating a vehicle placed thereon, and

FIG. 6 is a sectional view of the vehicle shown in FIG. 2 taken along the line 6-6 of FIG. 2.

Referring now to FIGS. 1 and 3, one embodiment of a launching structure 10 of the present invention has an inclined launching platform 12, sides 13 and 15, and a hand operated pump 26 having a pump handle 28. The launching platform 12 has openings 17, 19 and 21.

FIG. 3 also illustrates a toy vehicle 14 on the launching platform 12. The position of the vehicle 14 is shown by dash lines in FIG. 1. The vehicle 14 is shown from the top in FIG. 2. The vehicle 14 has an upper body 16, wheels 18, 20 mounted on an axle 21, and wheels 22, 24 mounted on an axle 25.

FIG. 4 shows the launching structure 10 from the bottom. A movable plate 30 is pivoted at one end on projections 32 and 34 which extend through openings 36 and 38 in the sides 13 and 15 of the launching structure. An air hose 40 connects the end of the cylinder 42 of the pump 26 to an elbow coupling 44 mounted on the plate 30. The plate 30 is moved up and down by a positioning plate 46 connected to a shaft 48 having lever arms 50 and 52 (the ends of which are shown by dash lines on FIG. 4, but which are shown by solid lines on FIGS. 1 and 3). The plate 30 has upwardly extending bosses 54 and 56 (see FIG. 1) which are adapted to extend through the openings 17 and 19 when the plate is in its raised position (see FIG. 5), and an upwardly extending nozzle 58 (see FIGS. 1 and 5) which is adapted to extend through the opening 21 when the plate is in its raised position (see FIG. 5). The nozzle 58 is connected through the coupling 44 to the air hose 40.

As shown in FIG. 5 the pump 26 has a pump cylinder 61, a plunger or piston 60 carried on a shaft 62 having at its upper end the handle 28.

When the plate 30 is in its raised position (shown by the solid lines in FIG. 5) the bosses 54 and 56 act as a latching device to hold the vehicle 14 in place for starting its drive wheel 18 or 20, and to release the vehicle when the drive wheel is rotating at a desired rate. In addition, the bosses 54 and 56 hold the drive wheel away from, i.e., elevated above, the platform 12. When the plate 30 is in its dash line position, the bosses 54 and 56 and the nozzle 58 are withdrawn from the vehicle 14 and it is free to move along the platform 12. The plate 30 is moved to its dash line position by moving the positioning plate to its dash line position. This is accomplished by moving either of the lever arms 50 or 52 from being adjacent surface 50a to surface 50b (see FIG. 3).

FIG. 6 is a cross-sectional view of the vehicle 14. The vehicle 14 has a lower body portion 64 which is connected to the upper body portion 16 by means of screws 66 and 68. The lower portion 64 of the body has a pair of indentations 70 and 72 near its front end. The lower portion of the body also has an opening 76 adapted for reception of the nozzle 58.

Inside the vehicle 14 is an air turbine 80. It is desirable to provide the turbine 80 with a flywheel effect in order to prevent undesirable fluctuations in the turbine speed. To this end, the turbine 80 may be constructed to have sufficient mass to provide such a flywheel effect. The turbine 80 is mounted on a shaft 82 which also has a first gear 84 mounted thereon. The shaft 82 is mounted in that portion of an upstanding plate 86 shown by dash lines so it can rotate. The plate 86 is mounted interior of the vehicle 14. The gear 84 engages a second gear 88 mounted on a shaft 90. The shaft 90 is also mounted in the upstanding plate 86 so it can rotate. The gear 88 engages a driving gear 92 which is mounted on the drive axle 21. Also mounted on the drive axle 21 are driving wheels 18 and 20. A separate driving wheel could be mounted on the same shaft 21 as the vehicle wheels 18 and 20 and positioned half-way therebetween.

To operate the vehicle 14 by compressed air, it is positioned as shown in FIG. 5 relative to the launching platform 12. The bosses 54 and 56 raise the wheels 18 and 20 above the platform 12 and prevent the vehicle 14 from moving. The nozzle 58 extends into the vehicle so that any compressed air therethrough in the direction of arrow 100 drives the turbine 80 in the direction of arrow 102.

Compressed air is obtained by moving the pump handle 28 up and down. This compressed air reaches the nozzle 58 through the hose 40 and flows in the direction of the arrow 100. Up to a point the more time the handle 28 is moved up and down, the faster the turbine 80 will rotate in the direction of the arrow 102.

When the turbine 80 and thus the drive wheels of the vehicle by means of the gear train comprised of gears 84, 88 and 92, are rotating at the desired rate, one of the lever arms 50 or 52 are moved so that the plate 30 moves from its solid line position shown in FIG. 5 to its dash line position. With the plate 30 in its dash line position the bosses 54 and 56 and nozzle 58 are withdrawn from the vehicle and its drive wheels can cause it to accelerate and move away from the launching platform.

In view of the principles set forth herein, we have shown some of the ways of carrying out the present in-

vention and some of the equivalents which are suggested by the disclosures.

Now, therefore, we claim:

1. A toy comprising a vehicle body, wheels rotatably mounted on said body, an air turbine mounted within said body in driving engagement with at least one of said wheels, said body having an opening adjacent to said turbine, and a launching structure comprising an air pump, a latching device to hold the vehicle in place for starting and to release said vehicle when it is ready to go, a nozzle positioned so that when air flows through said nozzle it is directed at said turbine to cause said turbine to rotate, and means connecting said pump to said nozzle through which compressed air from said pump can be directed through said nozzle.

2. A toy as called for in claim 1 wherein at least one of said wheels is the drive wheel, and at least one of said latching device and said nozzle holds said drive wheel in an elevated position prior to the release of said vehicle.

3. A toy as called for in claim 2 wherein said latching

device and said nozzle are mounted to move simultaneously.

4. A toy as called for in claim 1 wherein said launching structure includes an inclined platform fixedly positioned with relation to said pump, a movable plate, means for moving said plate, said latching device and said nozzle being mounted on said plate whereby when said plate is in its raised position said nozzle and said latching device are adapted to extend into said vehicle body and when said plate is in its lowered position said nozzle and said latching device permit said vehicle to move.

5. A toy as called for in claim 4 wherein a flywheel is mounted in said body in driving engagement with said turbine, and a positioning plate is pivotally mounted whereby in one position said positioning plate holds said movable plate in its raised position and in another position said positioning plate permits said movable plate to assume its lowered position.

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