United States Patent

Lemelson

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[54] **TOY VEHILCE AND TRACK**

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[21] Appl. No.: **188,311**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 11,562, Feb. 16, 1970, Pat. No. 3,611,622.

[52] **U.S. Cl.** .....**46/1 J,** 46/44, 46/243 AV

[51] **Int. Cl.** **A63h 30/06**

[58] **Field of Search** .....46/1 J, 44, 243 AV

[56] **References Cited**

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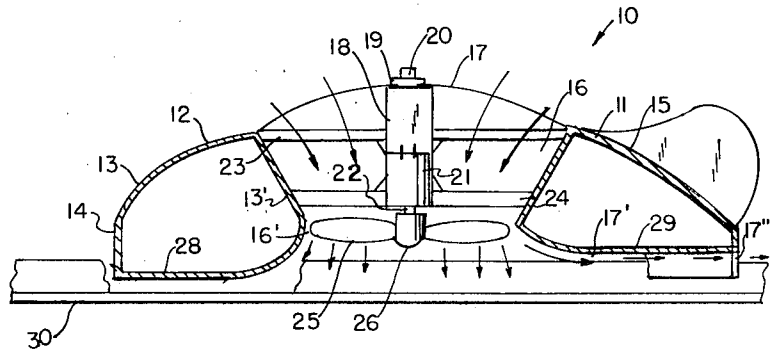
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Primary Examiner—Louis G. Mancene
Assistant Examiner—Robert F. Cutting

[57] **ABSTRACT**

A toy vehicle and track therefore are provided in which the vehicle is suspended on a layer of air disposed between the track and vehicle. In one form the vehicle contains own power supply and fan for generating flow of air therethrough and propelling same downwardly and readwardly to both float the vehicle on the track and propell it therealong. In another form, air is pressurized remote from the vehicle and fed to the vehicle through a duct which may comprise the track itself or a flexible line extending to the vehicle.

10 Claims, 3 Drawing Figures



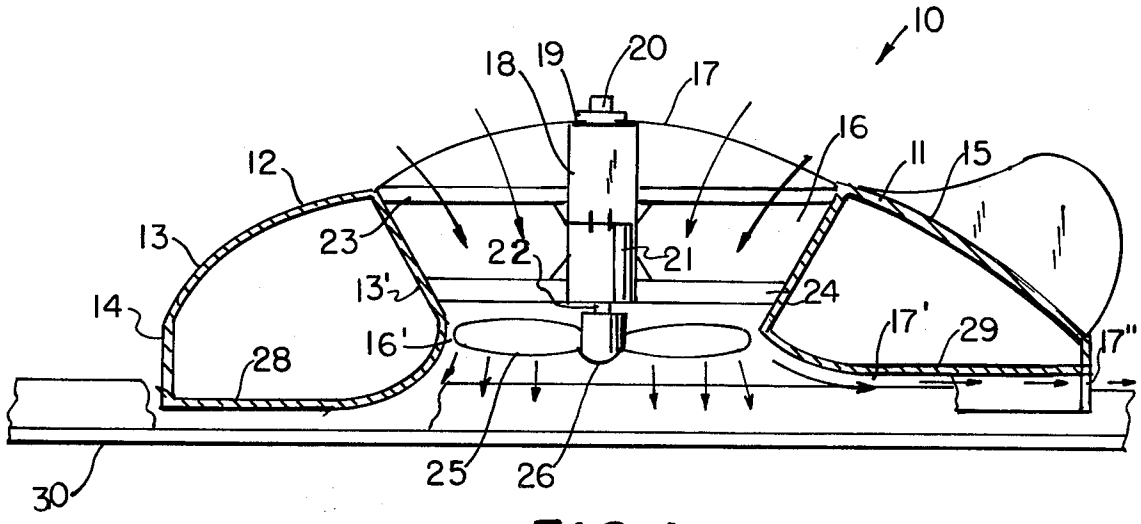


FIG. 1

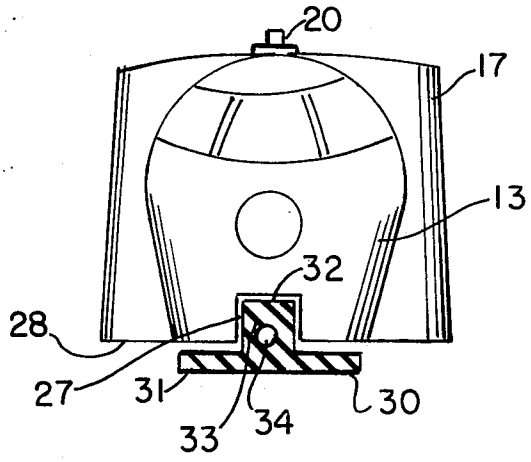


FIG. 2

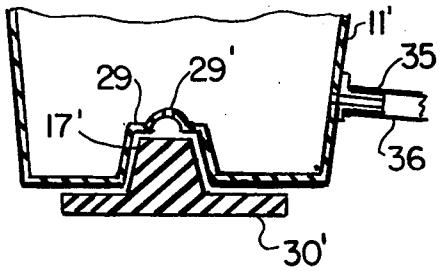


FIG. 3

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TOY VEHILCE AND TRACK

RELATED APPLICATIONS

This is a continuation-in-part of application Ser. No. 11,562 filed Feb. 16, 1970, , now U.S. Pat. No. 3,611,622 for a Track Toy.

SUMMARY OF THE INVENTION

This invention relates to a air operated toy and in particular to a vehicle toy employing air to both propell it along a track and float it above said track.

Various track travelling toys have been developed which are self propelled but require the use of wheels to support and propell the toy along a track. The instant invention is primarily concerned with a track travelling toy which does not require wheels to travel but, instead employs a flow of air to both suspend the vehicle above a track and propell said vehicle along said track. The same source of airflow to float the vehicle is also employed to propell the vehicle along the track. The method of support and propulsion of the vehicle is both mystical to a child and may be made of relatively few and simple components. The vehicle is shaped to conform at least in part to the track and the track serves both as a guide and means for supporting the vehicle without obstructing its travel when air is ejected thereagainst from the vehicle.

Accordingly it is a primary object of this invention to provide a new and improved vehicle toy and a track therefore.

Another object is to provide a track travelling toy which is self propelled and is relative simple in construction.

Another object is to provide an air support vehicle and a track therefore which may be easily varied in configuration.

Another object is to provide a vehicle toy and a track therefore which may be twisted or bent to various shapes.

With the above and such other objects in view as may hereafter more fully appear. the invention consists of any novel constructions, combinations and arrangements of parts as will be more fully described and illustrated in the accompanying drawings, but it is to be understood that changes, variations and modifications may be restored to which fall within the scope of the invention as claims.

In the drawings:

FIG. 1 is a side view with parts broken away for clarity of a toy vehicle and a portion of a track therefore;

FIG. 2 is a front view of the vehicle of FIG. 1 showing the track in cross section and

FIG. 3 is a partial view of the rear end of the vehicle of FIG. 1 showing the track sectioned.

In FIG. 1 is shown a toy vehicle **10** having a light weight hollow body **11** having front a rear portions **13** and **15** joined by a central portion **17** defined by a thin top wall **12** and a front end wall **14**. The rear wall portion **15'** of rear end portion **15** contains an opening **17''** therein terminating a passageway **17'** formed in the upper wall **29** of a U-shaped channel **27** formed in the underside of the vehicle. The U-shaped channel **27** extends completely along the underside of the vehicle **10** and is shaped to conform to the upwardly projecting portion **33** of a T-shaped track **30** which will be described. As shown in FIG. **2**, the conforming relationship between the channel **27** and the track **30** is such that the vehicle will be guided along said track on a layer of air or cushion developed when air is propelled downwardly from the vehicle.

Provided in the center of the vehicle **10** is a passageway **16** which tapers inwardly in the downward direction to a throat portion **16'** in which is located a plurality of fan blades **25** supported on a hub **26** which is secured to the shaft **22** of an electric motor **21**. The motor **21** is supported on a plurality of struts **24** which are secured to the wall **13'** of the passageway **16**. Attached to the rear end of motor **21** is a battery housing **18** containing one or more batteries for powering the motor when the actuator **20** of a switch **19** is properly operated to complete a circuit between the battery and the motor. Struts **23** are shown supporting the battery housing **18** to the wall **13'** of the passageway through the housing **11** of the vehicle.

The passageway **16** is open at the top for admitting air from above the vehicle thereto and is configured at the bottom end thereof to pass air sucked into the passageway by the rotation of the fan blades **25** against the track **30**. Depending on the weight of the vehicle **10**, the power of the motor **18**, configuration of the fan blades and the size and shape of the track **30**, air flowed through the passageway **16** may be ejected to react primarily on the upper surface **32** of the upright portion **33** of the track or may also be ejected as a thin layer against the upper surfaces of the flange portions **31** of the track to support the vehicle in lift above the track. A portion of the downwardly directed air is also caused to flow through the passageway **17** and ejected as a jet from the rear end of the vehicle to jet-propell the vehicle along the track in the opposite direction.

While the vehicle may be made of thin-walled injection molded plastic components or vacuum formed plastic, the track **30** is preferably made of an extrusion of plastic although it may also be injected molded of sections which are easily joined together at their ends by proper shaping. The track **30** of FIG. **2** is shown as containing a rod-like bendable metal member **34** embedded therein and is made of a flexible plastic such as plasticized polyvinyl chloride, low density polyethylene, ethylene vinyl acetate or polybutadiene styrene, polymers of sufficient flexibility to permit the track to be bent and to retain substantially the shape defined by the bent wire **34** therein. It is noted that the track **30** may be bent and retained in shapes which define both curves in the horizontal direction and hill-like deformations extending substantially vertically.

Depending on the shape and weight of the vehicle and the configuration of the passageway **17**, the lift generated to support the vehicle may result from reaction of the downwardly against both the upper surfaces of the track **30** and the surfaces adjacent thereto on which the track is supported. The track **30** may also have other configurations as shown, for example, in application Ser. No. 115,620 which configurations may include hollow trackways, triangularly shaped portions which extend upwardly and a plurality of rail portions similar to **33** but spaced apart from each other along the track.

In FIG. **3**, a flexible plastic tube **36** is shown connected to a tubular fitting **35** extending from the sidewall of the vehicle body **11'** connecting the interior

of tube **36** with the hollow interior volume V of the vehicle body **11'**. The other end of tube **36** is connected to a source of pressurized air such as an air compressor for supplying air under pressure to the vehicle. A plurality of small holes **29'** in the upper wall **29** of the passageway **17'** as well as the wall **28** of the passageway **17'** at the from end of the vehicle, permit air to escape from the body **11'** downwardly against the upper surface(s) of the track **30'** to provide lift and support or float the vehicle on the track. Escape of the portion of said air rearwardly through passageway **17'** provides thrust for jet propelling the vehicle along the track in the opposite direction.

The embodiment of FIG. **3** thus eliminates the need to provide a propulsion unit and motor within the vehicle thus requiring less air to lift and propell the vehicle along the track. However, the flexible tube may be cumbersome and limit the degree of movement or distance the vehicle may travel along the track. Two improvements are noted to reduce the drag caused by the tube **36** on the vehicle. In one, the tube is connected at its other end to a swivel-coupling on the air compressor or the pressurized tank thereof permitting it to rotate freely as urged by movement of the vehicle. In the other, the tube **36** may be made of very thin plastic film which is normally in a flat condition yet will expand to a substantially cylindrical shape when air from the air compressor or pressurized tank is admitted thereto. If made of 1 or 2 mil flexible plastic film such as polyethylene, polypropylene, polyamide or other suitable polymer, the tube **36** will be sufficiently light in weight and flexible to permit suitable movement of a toy vehicle along a substantial length of track as defined by the length of the film tube. The tube **36** may also be connected to a fitting or tubular formation at the top of the vehicle and may be connected at or near its other end to a freely swivelling overhead boom, the support for which contains or is connected to the outlet of the pressure source of air or compressor.

In yet another embodiment, the body of the toy vehicle may contain a tank of pressurized gas or itself may be constructed as a hollow container for pressurized gas or air to be ejected downwardly and rearwardly from small holes along the body channel wall to both lift and propell the vehicle along the track.

It is also noted that in addition to openings **20'** in the upper wall of the channel **29** in the underside of the body **11** small holes may also be provided in the portions of the bottom wall **28** of the vehicle which are lateral to the channel **27** for supporting the vehicle by lift developed in the cushion of air generated against either or both the flanges **31** of the track and the surface adjacent the track which supports the track. By ejecting air into the channel, not only is lift provided in reacting against the upper surface **32** of the central portion **33** of the track, but said air flows along the vertical walls of portion **33** and may serve to maintain the side walls of the channel **27** away from the side walls of portion **33**. The bottom portion of the vehicle may thus be shaped to conform properly to the entire track **30** as well as a flat surface adjacent the flanges **31** on which the track rests.

In yet another configuration, a plurality of free wheeling wheels may be supported by the vehicle body to engage either portions of the track **30** or the surface adjacent thereto when the cushion forming air or gas is reduced in pressure or eliminated and may be used in starting the vehicle in operation.

I claim:

1. A toy comprising in combination:
a toy vehicle having a light weight body,
a toy track for guiding said vehicle,
said track and the underside of said vehicle being configured to conform to each other whereby the track may guide the vehicle in travel along its length,
means for flowing gas downwardly from said vehicle under sufficient pressure to support said vehicle off said track track on a cushion of said gas, and
means for imparting thrust to said vehicle while it is so supported above said track to cause it to travel along said track.

2. A toy in accordance with claim **1** wherein said means for imparting thrust to said vehicle comprises means for directing part of said gas rearwardly of said vehicle.

3. A toy in accordance with claim **1** wherein said means for flowing gas downwardly comprises a ducted fan supported within said vehicle and ducting means for carrying external air to said fan and directing it downwardly from said fan to react beneath the vehicle and support said vehicle on a cushion of air.

4. A toy in according with claim **3** wherein said ducting is shaped to direct air downwardly against said track at sufficient velocity to provide a cushion of air between said track and vehicle.

5. A toy in accordance with claim **4** wherein said ducting means is also operable to direct air against the surface adjacent the track on which said track is supported and to derive lift for said vehicle in reacting against said adjacent surface.

6. A toy in accordance with claim **1** wherein said means for flowing gas downwardly from said vehicle comprises a remotely located source of pressurized gas and a flexible tube connecting said source and said vehicle, and receiving means on the vehicle for receiving and directing said gas downwarly from the vehicle.

7. A toy in accordance with claim **6** wherein said flexible tube is thin flexible plastic film less than about 0.003 inch thick and is normally in a flat condition until gas from said source is passed therethrough.

8. A toy in accordance with claim **6** wherein said vehicle has a hollow body, a channel-like passageway formed in the under side of said vehicle along the length of said vehicle body disposed over the upper part of said track, said channel being configured to conform to said track with at least a portion of the track disposed within said channel, means for connecting said tube to said body, a plurality of holes in the upper wall of said channel for directing gas from said hollow body downwardly against the upper surface of said track.

9. A toy in accordance with claim **1** wherein said track is flexible and may be shaped by hand to various curved configurations.

10. A toy in accordance with claim **1** including means at both ends of said track for connecting it to other sections of similar track.

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