Nov. 9, 1971 D. V. BOSLEY ET AL 3,618,397

SPEEDOMETER FOR TOY VEHICLES

Filed Nov. 26, 1969 3 Sheets-Sheet 1

FIG. 1

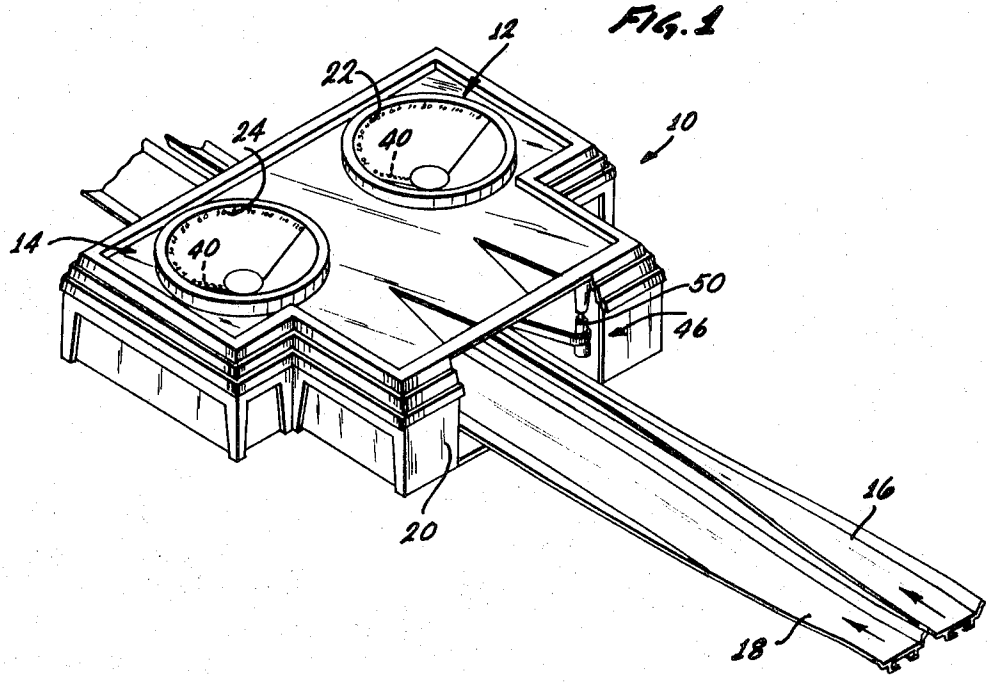
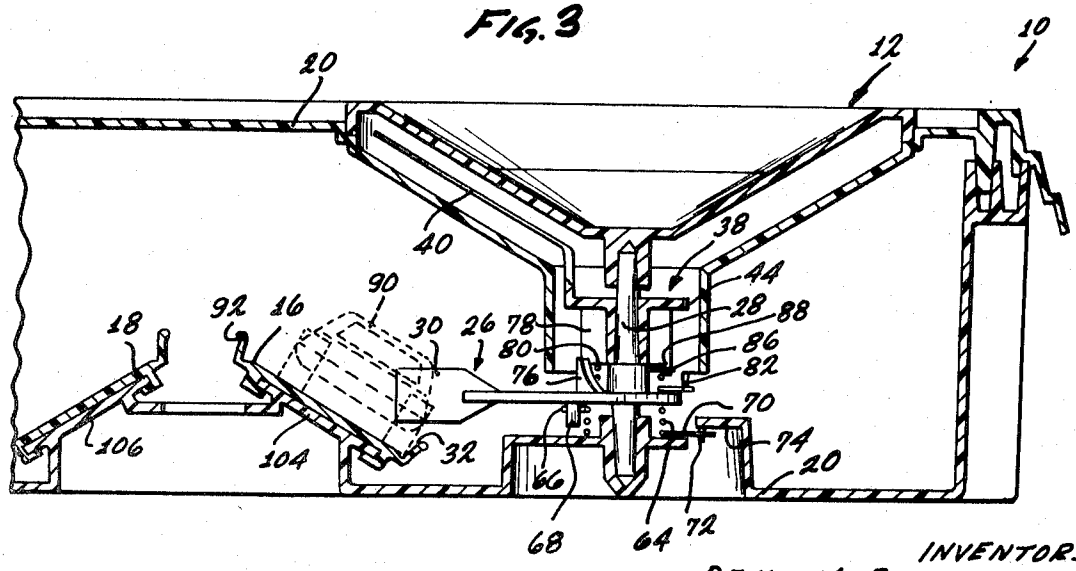


FIG. 3



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SPEEDOMETER FOR TOY VEHICLES

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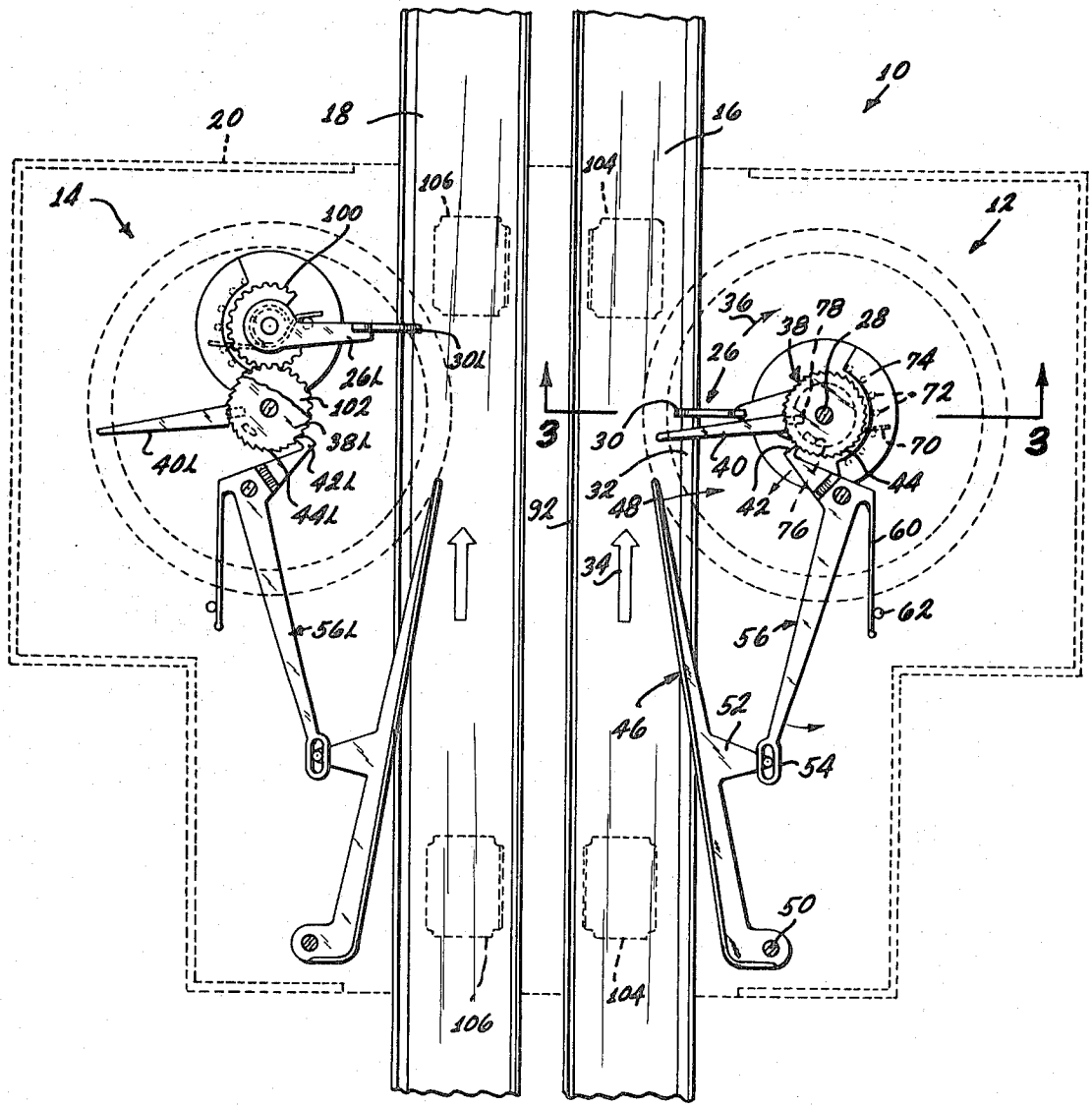


FIG. 2

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SPEEDOMETER FOR TOY VEHICLES

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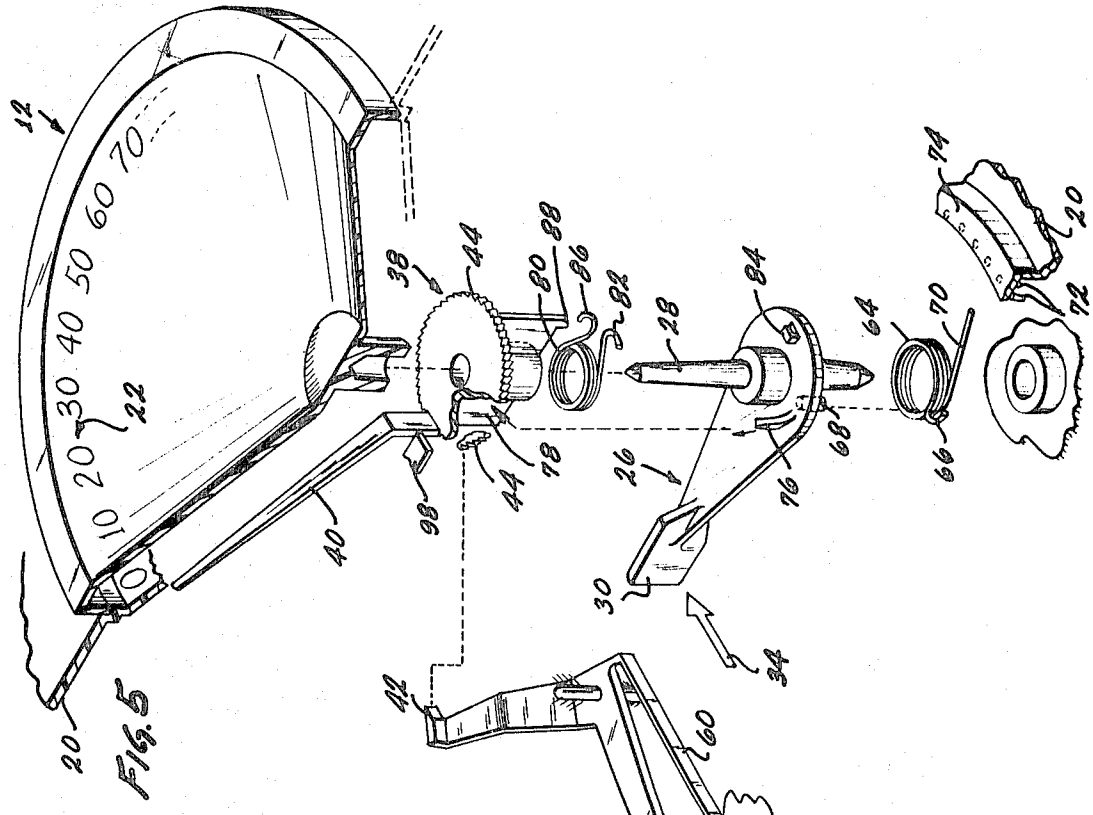


Fig. 5

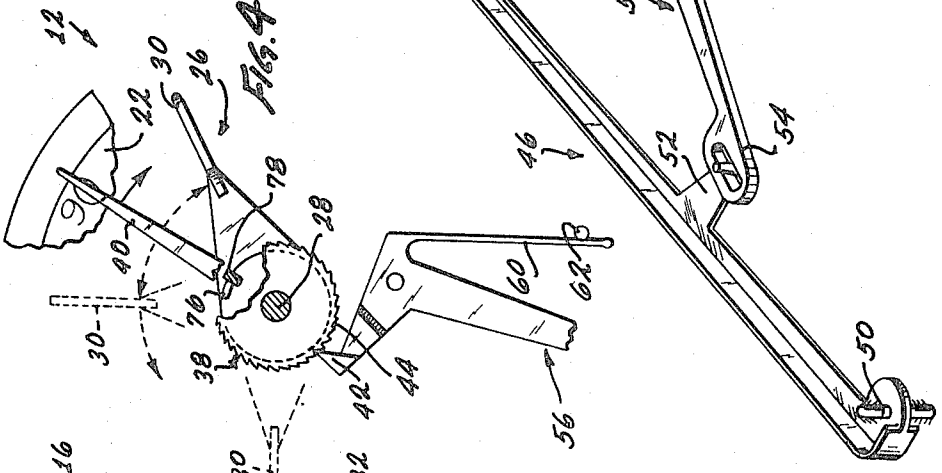
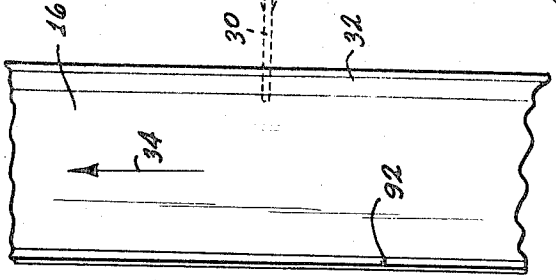


Fig. 4



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SPEEDOMETER FOR TOY VEHICLES

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Int. Cl. G01p 3/12; A63f 9/14
U.S. Cl. 73—488 9 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for indicating the speed of toy vehicles moving along a track comprising an impulse vane which is biased by a spring to a position over the track, so that the speed of a toy vehicle hitting the vane determines how far it will be pivoted against the spring force. The vane turns an indicator wheel with a pointer extending therefrom which moves over a scale to indicate the speed of the vehicle. A pawl which engages ratchets on the indicator wheel retains it at the furthest position to which it has been moved by the vane. A resetting lever is positioned uptrack from the vane so it is hit by a vehicle prior to the vehicle hitting the vane, the resetting lever releasing the indicating wheel from the pawl, so the pointer returns to a zero position. A track section over which the vane extends is banked towards the vane to make sure that both wide and narrow vehicles hit approximately the same portion of the vane, to increase accuracy.

BACKGROUND OF THE INVENTION

(1) Field of the invention

This invention relates to toy vehicles and, more particularly, to accessories for use with toy vehicles.

(2) Description of the prior art

Children often play with toy vehicles by racing them along tracks, either individually to see how fast they go, or against one another in races. An indication of the speed of a toy vehicle at any location along a track layout would provide added enjoyment by providing a definite indication of a vehicle's speed. Such a device should provide the same speed indication for vehicles moving at the same speed, for any one of a variety of types which may be raced along a track, and it must be economical to produce to enable its widespread use.

OBJECTS AND SUMMARY OF THE INVENTION

An object of the present invention is to provide a speedometer for toy vehicles.

Another object is to provide a toy speedometer which is accurate for a wide variety of vehicles, and which is of simple and reliable construction.

In accordance with one embodiment of the present invention, a speedometer is provided which includes a pivotally mounted impulse vane which is spring-biased to a position over a toy vehicle track, so that a toy vehicle hitting the vane pivots it in an amount dependent upon the speed of the vehicle. A pivotally mounted indicating wheel is provided which is moved by the impulse vane, the indicating wheel carrying a pointer that moves over a speed indicating scale. A pawl that engages a ratchet wheel fixed to the indicating wheel allows the indicating wheel to move in the direction in which it is pushed by the vane, but prevents its return. Accordingly, the pointer remains at the furthest position to which it has been moved, which indicates the speed of the vehicle.

A resetting lever is provided which is positioned immediately up-path from the vane, so that a vehicle first

hits the resetting lever before hitting the vane. When a vehicle hits the resetting lever, the lever releases the ratchets on the indicating wheel from the pawl, so that the indicating wheel can return to a zero position to provide a new speed indication. The speedometer includes a banked track section, and the impulse vane extends over the lower side of the track. Accordingly, vehicles moving along the track drift down to the lower side to hit the vane. The banked track causes both wide and narrow vehicles to be positioned at one side of the track so that they all hit the vane at about the same point thereon, to provide increased accuracy.

In order to enable simultaneous testing of two toy vehicles, a pair of speedometers is provided on one frame, for engaging vehicles on two tracks. This enables children to race cars against each other by merely determining which one produces a higher speed indication. In order to provide accurate relative speed indications, the speedometers have a spring mounting that allows adjustment of the preloading of the spring which biases the vane towards a position above the track. A child can vary the spring loading to make both speedometers provide the same reading for cars traveling at the same speed.

The novel features of the invention are set forth with praticularity in the appended claims. The invention will be best understood from the following description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a speedometer apparatus constructed in accordance with the invention;

FIG. 2 is a sectional plan view of the speedometer apparatus of FIG. 1;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a partial sectional view of the apparatus of FIG. 1; and

FIG. 5 is a partial exploded view of the apparatus of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 illustrates a speedometer toy **10** having two speedometers **12, 14** for measuring the speed of toy vehicles moving along two tracks **16, 18**. As a vehicle on either track passes through a housing **20** of the apparatus, a pointer moves over a speed scale **22** or **24** to indicate the speed of the vehicle. The speed scales may be proportioned to the approximate scale of the vehicle as compared to full size vehicles which they represent. The pointer retains the speed indication until another toy vehicle moves through that speedometer. A new vehicle successively resets the pointer so it falls to zero, and produces a new speed indication which moves the pointer to a position indicating the speed of the newly arrived vehicle. Each speedometer works independently of the other and can be used alone. However, the dual speedometer arrangement allows a pair of toy vehicles to be raced against each other to determine which is faster, or to determine the effects of any track accessories which the vehicle traverses prior to reaching the speedometer.

As shown in FIG. 2, the speedometers **12, 14** are very similar, so a description of one of them will largely apply to the other. Speedometer **12** includes an inpulse vane lever **26** fixed to a shaft **28** that is pivotally mounted on the housing. The vane lever **26** includes a vane **30**, and is spring-biased to the position shown in the figure, wherein it lies over one side **32** of the track **16**. A vehicle moving along the track in the direction of arrow **34** will hit the vane **30** and cause the lever **26** to pivot in the direction of arrow **36** away from its initial position, against the

spring force, to an angle which depends primarily upon the vehicle speed. As the vane lever pivots in the direction of arrow **36**, it pushes an indicator wheel **38** to rotate it in the same direction so that a pointer **40** fixed to the indicator wheel moves over the speed scale **22**. The furthest angle to which the pointer **40** is moved indicates the speed of the vehicle.

After the vane lever **26** has been pivoted to its maximum angle, the spring force returns it to its initial position shown in FIG. 2. However, a pawl **42** engages ratchets **44** on a ratchet wheel which is fixed to the indicator wheel to retain the indicator wheel at the furthest position to which it has been pivoted. Accordingly, the speedometer retains a speed indication indefinitely. The vane lever and indicator wheel are of light weight construction to provide a minimum moment of inertia, so that vehicles passing through the speedometer are not slowed significantly.

The speed indication is reset to zero when another vehicle passes along the track and hits a resetting lever **46** whose outer end **48** is positioned up-path from the vane **30** on the vane lever. When a vehicle hits the outer end **48** of the resetting lever, the lever pivots around a shaft **50**. An arm **52** on the resetting lever engages one end **54** of a pawl lever **56** on which the pawl **42** is mounted. The pawl lever is then pivoted so that the pawl **42** disengages from the ratchets **44** on the indicating wheel, to allow a spring to return the indicating wheel to its initial position wherein the pointer **40** points to a zero speed level on the speed scale. A spring arm **60** on the pawl lever **56** has an outer end which abuts a pin **62** on the housing so that the spring arm **60** is deflected. The spring arm **60** biases the pawl arm **56** toward a position wherein the pawl **42** is engaged with the ratchets **44** on the indicating wheel. The pawl lever **56**, in turn, biases the resetting lever **46** towards the position shown in FIG. 2 wherein the outer end **48** is in the path of vehicles moving along the track.

FIG. 5 illustrates the mechanism of speedometer **12** in greater detail. The mechanism includes a coil spring **64** which supplies the force for biasing the impulse vane lever **26** towards a position in the path of vehicles. The spring has one end **66** engaged with a pin **68** fixed to the vane lever and an opposite end **70** which is held by one of several pins **72** on a spring holding bracket **74** that is fixed to the housing **20**. The vane lever **26** also carries a driving member **76** that engages a face portion **78** on the indicator wheel **38** to drive it in the direction of the arrow **36** while allowing the vane lever to return to its initial position without urging the indicating wheel towards its initial position. The indicating wheel is spring-biased towards its initial position by a spring **80** disposed about the vane shaft **28**, which has one end **82** engaged with a member **84** on the vane lever **26** and another end **86** engaged with a protrusion **88** on the indicating wheel The spring **80** returns the indicating wheel back to its initial position when it is released from the ratchet **42**. Both springs **64**, **80** are preloaded to assure return of the vane lever and indicating wheel. The vane spring **64** is of much higher spring constant and provides a higher torque than the other spring **80**, so that the vane lever **26** can return to its initial position against the force of spring **80**.

As shown in FIG. 3, the track **16** is banked at the portion which carries a vehicle **90** past the position of the impulse vane **30**. The purpose of this banking is to allow gravity to urge the vehicle towards one side **32** of the track where the impulse vane **30** is located. This assures that even narrow vehicles will be located along the side **32** of the track, instead of possibly moving along the opposite side **92** where they might miss the impulse vane. Of course, it would be possible to make the impulse vane **30** longer so that it extended further over the track. However, some vehicles might hit the outer end of the vane while others might hit the vane at a position closer to the center of pivoting of the vane lever, and this difference could cause a difference in the speed level which was registered on the speedometer. In order to eliminate the effects of vehicle size or the position at which the vehicle happened to be located on the track as it passed the vane, the vane is located at only one side of the track and the track is banked to make all the vehicles roll along the same position.

Sometimes, a toy vehicle may be pushed very slowly through the speedometer, so it moves the impulse vane **30** only far enough to allow the vehicle to pass by. It would be undesirable to have the pointer register an appreciable speed in this case, as it would make a child think the speedometer was very inaccurate. To prevent this, a retainer shown at **98** in FIG. 5 is provided to limit the pivoting of the indicating wheel in a direction opposite to arrow **36**. The retainer **98**, which is mounted on the housing, holds the pointer, so that the driving member **76** on the vane lever is spaced from the face portion **78** of the indicating wheel until the vane lever is pivoted at least a predetermined amount. The spring **80** urges the indicator wheel **38** to rotate counterclockwise, as viewed in FIG. 5, so that the face portion **78** of the indicator wheel moves towards engagement with the undeflected driving member **76**. However, the retainer **98**, which is a simple projection fixed to the housing, prevents the indicator wheel **38** from rotating counterclockwise far enough for the face portion **78** thereon to contact the driving member **76**. Thus, if the driving member **76** moves a small distance towards the face portion **78**, as occurs when a vehicle is slowly pushed through the speedometer, the driving member **76** will not contact the face portion **78** and the indicator wheel **38** will not rotate even a small amount.

The second speedometer **14** is constructed in a manner largely similar to the above-described speedometer **12**. The differences are largely due to the fact that the vane of the left speedometer, must contact vehicles moving along the left side of its track **18**, since there is not enough space on the right side to accommodate their mechanism. As shown in FIG. 2, the left speedometer **14** has an impulse vane lever **26L** with a vane **30L** that extends over the left side of the track **18**. The vane lever **26L** is coupled to an indicating wheel **38L** through a pair of gears **100**, **102**. The gears are used to obtain a reversal of pivoting direction between the vane lever **26L** and indicating wheel **38L**, because the pointer **40L** would move to the right in indicating successively higher speeds, since this direction of movement is the conventional direction used in almost all meters. The left hand speedometer also includes a pawl **42L** which engages a ratchet wheel portion **44L** mounted above the gear **102** on the indicating wheel. The pawl **42L** is part of a pawl lever **56L**, and the pawl can be released when a vehicle strikes a resetting lever **46L**.

Where only one speedometer is used, the accuracy of the speedometer is generally not important, so long as it provides repeatable indications, that is, it should provide the same indication every time vehicles traveling at a particular speed pass through the speedometer. However, where two speedometers are used together, it is important that both provide the same speed indication for vehicles traveling at the same speed. To provide for such uniformity, the speedometers are constructed to enable a child to make small adjustments in the speed indications. As shown in FIG. 5, the end **70** of the spring which biases the vane lever towards its initial position can be held against any one of several different pins **72**. By moving the spring end **70** to different pins, a child can vary the spring loading, and therefore vary the impulse which a vehicle must apply to the vane to cause a given speed indication. In order to make both speedometers provide the same speed indications for vehicles moving at the same speed, only one of the speedometers must be adjusted, it being adjusted to provide about the same readings as the other speedometer.

While the speedometer apparatus could be provided with vehicle tracks that connect to other track sections of a track layout, the apparatus can be made more compact by providing only means for receiving a track. As shown, in FIG. 3 the apparatus includes a pair of lands **104, 106**, which are designed to receive separate track sections. The track sections **16, 18** which they are designed to receive are flexible members with grooves on their underside which can firmly engage the lands. The lands **104, 106** are angled, so that the track section twists to a banked orientation at the portion which moves past the impulse vanes. The ends of a relatively long track section, such as one about two feet long, will generally be unbanked when connected to a track layout whose track portions on either side of the speedometer apparatus are unbanked.

Thus, the invention provides a speedometer which is of relatively simple construction, yet which provides an accurate relative indication of vehicle speed. The apparatus is constructed with two speedometers to enable a pair of vehicles to be raced against each other to determine which is faster.

Although particular embodiments of the invention have been described and illustrated herein, it is recognized that modifications and variations may readily occur to those skilled in the art and, consequently, it is intended that the claims be interpreted to cover such modifications and equivalents.

What is claimed is:

1. A speedometer for toy vehicles moving along a predetermined path comprising:
- means defining a toy vehicle path;
- an impulse vane;
- means for biasing said impulse vane toward a position in the way of vehicles moving along said toy vehicle path, so that vehicles rapidly moving along said path and having a mass much greater than the effective mass of said vane, thrust said vane out of said vehicle path to a position dependent largely upon the speed of said vehicle; and
- means for retaining an indication of the furthest position to which said vane has been thrust out of said vehicle path.

2. The speedometer described in claim **1** including:
- resetting means including a member located up-path from the position of said impulse vane when it is in the path of vehicles, for resetting said indication of the furthest position to substantially a position indicating zero speed, prior to said vehicle reaching said impulse vane.

3. The speedometer described in claim **1** wherein:
- said impulse vane has an outer end which projects over only one side of said toy vehicle path; and
- said means defining a toy vehicle path includes means for holding a track at a banked orientation so that the side of said toy vehicle path over which said impulse vane extends is lower than the opposite side of said path, whereby to assure that all vehicles will hit said impulse vane at about the same location thereon.

4. The speedometer described in claim **1** wherein:
- said means for retaining an indication includes a scale, a pivotally mounted pointer with an outer end for indicating values on said scale, a spring for urging said pointer toward a predetermined initial position relative to said scale, means for coupling said impulse vane to said pointer to enable said vane to move said pointer in a first rotational direction away from said initial position, pawl means for resisting rotation of said pointer in a direction opposite to said first direction, and resetting means for releasing said pointer from said pawl means.

5. A speedometer for toy vehicles comprising:
- a housing;
- means for holding a vehicle track to said housing;
- a vane lever pivotally mounted on said housing, said lever having an end portion movable to a position in the path of vehicles moving along a track which is held to said means for holding a vehicle track;
- a driving member mounted on said vane lever;
- wheel means pivotally coupled to said housing, including means for engaging said driving member to receive pivoting forces from it that pivot said wheel means in a predetermined direction, and said wheel means also including ratchets;
- spring means for urging said vane lever towards said position wherein said end portion is in the path of vehicles, and urging said wheel means in a direction opposite to said predetermined direction in which it can be moved by said vane lever;
- a pawl biased towards said ratchets of said wheel means for retaining it in a position to which it has been pivoted by said vane lever;
- means for disengaging said pawl from said ratchets; and
- means responsive to the position of said wheel means for indicating speed.

6. The speedometer described in claim **5** wherein:
- said means for disengaging comprises a lever pivotally mounted on said housing with a portion at a position along a track on said means for holding a vehicle track, which is up-path from said end portion of said vane lever, and means for coupling said lever to said pawl to move said pawl away from said ratchets when a vehicle hits said lever.

7. The speedometer described in claim **5** including:
- means for retaining said wheel means at a position spaced from said driving member, so that said wheel means is not moved until said vane lever is moved by at least a predetermined amount.

8. The speedometer described in claim **5** wherein:
- said means for holding a vehicle track is banked to urge vehicles toward one side of a track held by said means for holding a track.

9. A speedometer for toy vehicles comprising:
- a toy vehicle track for carrying toy vehicles;
- an impulse vane;
- means for pivotally mounting said vane to swing from a position over said track to positions spaced from the path of toy vehicles moving along said track;
- means for biasing said impulse vane toward said position over said track, so that toy vehicles rapidly moving along said track can thrust said vane to one of said positions which are spaced from the path of toy vehicles moving along said track; and
- means for indicating the furthest position to which said vane has been thrust from said position in the path of vehicles moving along said track.

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73—491, 506, 527; 273—86