Nov. 6, 1962 V. F. WIGAL 3,061,972

CLIMBING TOY

Filed May 25, 1959 2 Sheets-Sheet 1

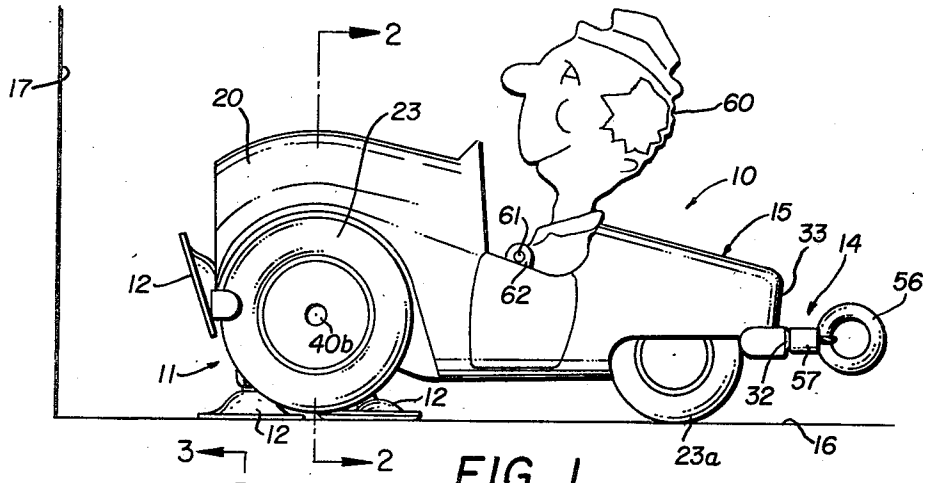


FIG. 1

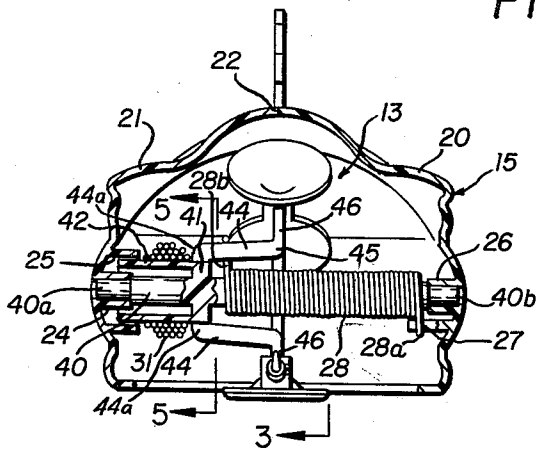


FIG. 2

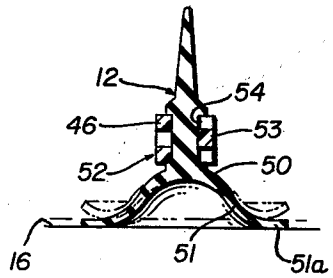


FIG. 4

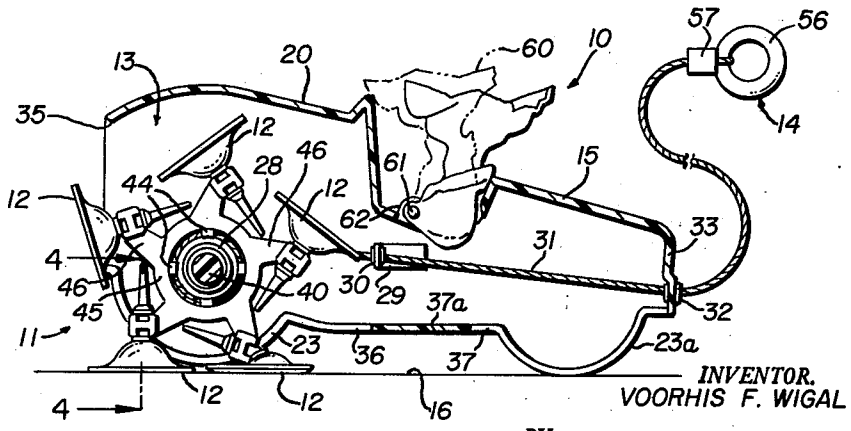


FIG. 3

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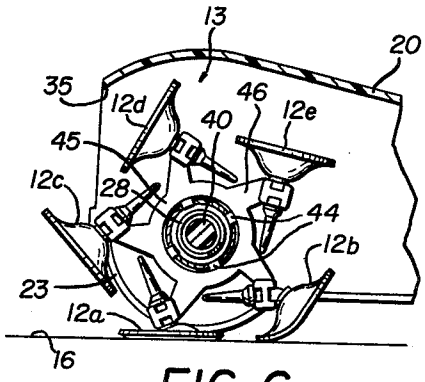


FIG. 6

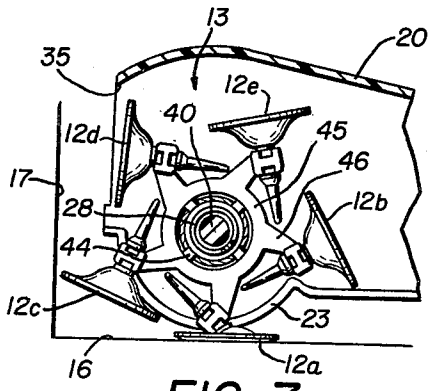


FIG. 7

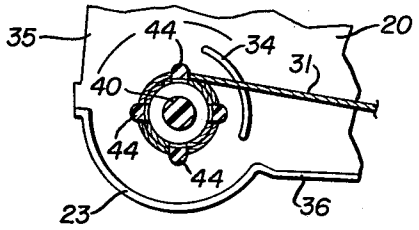


FIG. 5

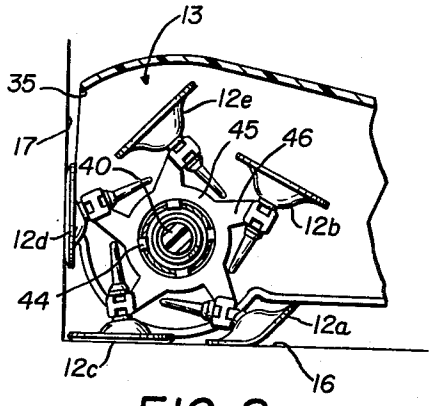


FIG. 8

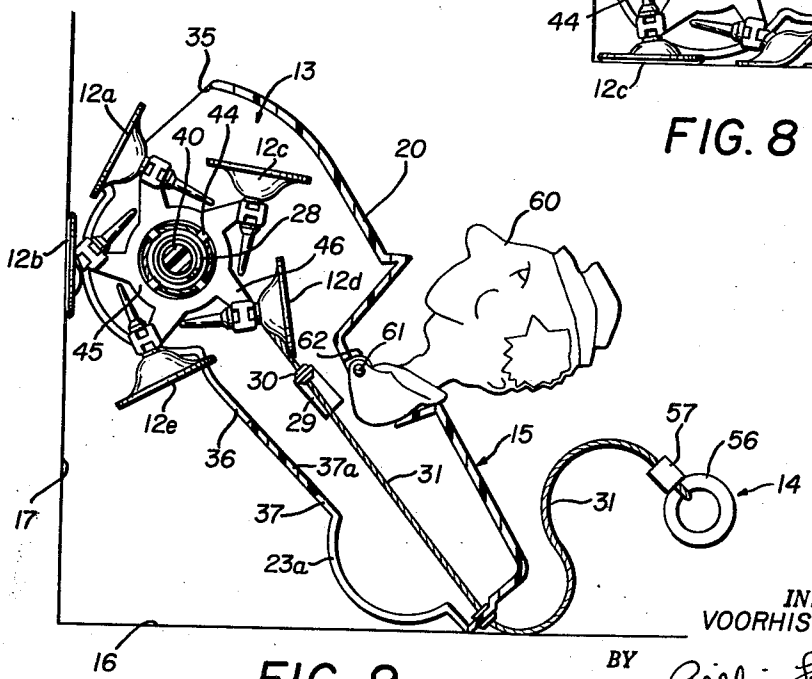


FIG. 9

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CLIMBING TOY

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6 Claims. (Cl. 46—206)

This invention relates to toys and in particular relates to an improved type of climbing toy that is designed to automatically advance over a smooth surface for the purpose of providing entertainment to the user.

In U.S. Patent 2,618,889, issued November 25, 1952, to Voorhis F. Wigal, a toy having these general characteristics was provided. The climbing toy of this patent featured a sprocket wheel having a plurality of circumferentially arranged suction cups that progressively engaged the smooth surface so that upon rotation of the sprocket relatively of the toy body, the cups would successively engage and release to progressively advance the toy across the surface involved.

While the climbing toy of the above described patent has met with great commercial success, it has been found that the same is possessed of certain inherent disadvantages.

First, and from the standpoint of winding the toy for use, it was necessary in the prior patent to effectuate the winding up of the sprocket wheel by hand rotation. This was time consuming and often difficult for small children to accomplish because of the fact that the suction cups had to be moved relatively of the body and retained in wound condition during placement on the surface.

In addition to being difficult, it frequently happened that the user would wind the sprocket wheel in the wrong direction, with the result that the toy would not properly operate.

As a second disadvantage of the climbing toy shown in the above described patent, it is to be noted that the use of the same is limited to use on continuous flat surfaces, with the result that if the forward part of the toy struck an object, such as a wall surface, that was at right angles to the original surface, the suction cups would be disengaged and the toy would cease to function.

It has been discovered that the above described disadvantages can be obviated by the following improvements.

First, if a spring loaded cord rewind structure is employed to wind the sprocket wheel against the force of the activating spring, it has been found that the toy can be easily and quickly readied for use, even by small children, with the possibility of winding in the wrong direction being completely eliminated.

Secondly, it has been further discovered that if the sprocket wheel bearing the suction cup is moved forwardly of the body and the front portion of the body is cut away so as to permit the rotating suction cups to "reach" out beyond the same, that the climbing toy device will actually be enabled to traverse right angle surfaces without any interruption whatsoever.

Production of an improved climbing toy having the above improvements accordingly becomes the principal object of this invention, with other objects of the invention becoming more apparent upon a reading of the following brief specification, considered and interpreted in the light of the accompanying drawings.

Of the drawings:

FIGURE 1 is a side elevational view of the improved climbing toy.

FIGURE 2 is a vertical section taken on the lines 2—2 of FIGURE 1.

FIGURE 3 is a vertical section taken on the lines 3—3 of FIGURE 2.

FIGURE 4 is a vertical section taken on the lines 4—4 of FIGURE 3.

FIGURE 5 is a vertical section taken on the lines 5—5 of FIGURE 2.

FIGURES 6, 7, 8 and 9 are vertical sectional views showing the position of the suction cups during operation of the device.

Referring now to the drawings and in particular to FIGURE 1 thereof, the improved climbing toy, generally designated by the numeral **10**, is shown provided with an advancing mechanism **11** that includes a plurality of suction cups **12**, **12** mounted on the peripheral edges of a sprocket wheel **13**, with sprocket wheel **13** being wound under tension by use of cord winding means **14** so as to permit the car body **15** to continuously advance across surfaces **16** and **17** that are shown disposed at right angles to each other.

Considering first the structure of the car body **15**, it is to be understood that the same is preferably made of mating molded halves **20** and **21** that are secured together, as at **22**, in known manner to define a simulated hollow car body having molded front wheels **23** and molded integral rear wheels **23***a* with other conventional portions of the car body being similarly simulated in the body, as shown in FIGURE 1.

Referring to FIGURE 2, it will be seen that the body half **21** is provided with concentric tubular projections **24** and **25**, while the body half **20** has a tubular projection **26** that is concentrically opposed to the projection **24** so as to to support the opposed axial ends of sprocket **13**, as will hereinafter be described. Additionally, a pin **27** projects inwardly from the inner face of the body half **20** for the purpose of receiving one end of a winding spring **28** as is best shown in FIGURE 2 of the drawings.

To the end of supporting and guiding the cord mechanism **14**, the body half **21** is further provided with a bracket **29** that has an eyelet **30** through which cord **31** may be passed, with a similar eyelet **32** being provided in the rearmost portion **33** of the body section **21** for additional guiding support (see FIGURE 3). A guide rail **34** of arched configuration (FIGURE 5) also projects from the body portion **21** to center cord **31** on sprocket **13** at all times, while bumper **57** and ring **56** are also provided on cord **31** for known purposes.

For the purpose of permitting clearance of the suction cups as the same move relatively of the body **15**, the front portion of the body **15** is shown preferably cut away, as at **35**, to a width sufficient to allow the suction cups **12**, **12** to pass therebetween. Also, it is, of course, to be understood that similar undercuts **36** and **37** are provided on the undersurfaces of the formed body **15**, with rib portions **37***a*, **37***a* being provided on the respective body halves for the purpose of providing rigidity to the body **15**, while permitting clearance of the suction wheels during their movement relatively thereof. In this manner, the suction cups, during rotation will project beyond and below the front portion of body **15**.

The sprocket wheel assembly **13** is best shown in FIGURES 2, 3 and 5 through 9 of the drawings and, accordingly, it will be noted that the same includes a central shaft **40** having opposed axial ends **40***a* and **40***b* that are preferably of reduced diameter to permit journaling in the opposed tubular projections **24** and **26**, respectively, with this condition being best shown in FIGURE 2 of the drawings.

Spaced axially inwardly from the axial end **40***a* of shaft **40** is a radially extending flange **41** that has an axially projecting tubular housing **42** upon which the cord **31** may be wound, as shown in FIGURE 2 of the drawings. In this regard, it is important to note that the cylindrical housing **42** serves as a drum for the cord **31** and, accordingly, for the purpose of preventing fouling of the cord winding mechanism **14**, the external diameter of this drum is shown as being somewhat less

than the internal diameter of the tubular member **25**, with this diameter difference just described being preferably less than the thickness of the cord **31** so as to prevent entry of the cord **31** between the drum **42** and cylindrical member **25**. Further in this regard, the drum **42** is shown preferably located at a radial distance from the outer periphery of a circular course of axially extending arms **44**, **44** that are secured to flange **41** and, in this manner, the ends of said arms define shoulders **44***a*, **44***a* that serve to retain the cord in place on drum **42** at all times. (See FIG. 2.)

In addition to the aforementioned structure, the sprocket **13** is further characterized by the fact that the projecting ends of each arm **44**, **44** are connected to a sprocket wheel **45** that has a series of fingers **46**, **46** projecting therefrom, with these fingers each supporting a suction cup **12**, as will now be described.

In this regard, the construction of a typical suction cup and the mounting thereof is shown best in FIGURE 4 where each cup is illustrated as including a base **50** having a bell-shaped body section **51** that terminates in a peripheral edge **51***a*, with the opposed face of base **50** having a projecting shank **52** that is provided with a reduced diameter portion **53** that may be positioned in an appropriately contoured opening **54** that is provided in the ends of the fingers **46**. In this manner, each cup is flexibly attached to a finger **46** so that the sprocket may move during engagement of the cup.

It is also preferred that the surfaces of each cup **12** be roughened or provided with other air escape means so as to effectuate a holding or gripping of the surface by the same for a relatively short but substantially predetermined length of time. In this fashion, the engagement of one cup can be timed to release of the preceeding cup and vice versa, so that rapid advance of the toy is possible.

To the end of permitting the sprocket mechanism **13** to be wound under tension relatively to the body **15**, the opposed ends **28***a* and **28***b* of spring **28** are shown secured around pin **27** and a selected arm **44**, respectively. Further and for the purpose of providing animation during use a head figure **60** is pivoted as by pin **61**, to appropriate opposed journals **62**, **62** that are provided on the body section **20** and **21**.

In use or operation of the improved climbing toy, it will first be assumed that the component parts have been assembled as indicated in the drawings, with the suction cups having been assembled on the sprocket wheel and with the cord and spring means being connected between the body and the sprocket wheel.

In this condition, it is merely necessary that the user exert a pull on the ring **56**, which will cause cord **31** to rotate the entire sprocket assembly **13** relatively of the body **15** against the force of spring **28**, which will then become under tension.

At this point, the front portion of the body **15** may be positioned adjacent the surface **16** as shown in FIGURE 6 of the drawings, wherein suction cup **12***a* has just been snapped into position. When suction cup **12***a* has been engaged, it is believed apparent that the tension of wound spring **28** will then advance suction cup **12***c* towards surface **16** as shown in FIGURE 7, with suction cup **12***c* engaging surface **16** prior to release of suction cup **12***a*, as shown in FIGURE 8. When the condition of FIGURE 8 is reached, the advancing suction cup **12***d* will have reached out forwardly of the body **15** and will have engaged against the wall surface **17**. It follows that continued rotation of sprocket wheel **13** will ultimately cause cup **12***e* to engage surface **17**, followed by engagement of cup **12***b*, as shown in FIGURE 9.

Engagement of cup **12***b* is then sequentially substantially followed by engagement and release of cups **12***c*, **12***d* and **12***e*, respectively.

In all instances, it will be noted that the rear portion **33** of the body **15** serves as a stop to prevent rotation of the body **15** around the axis of the sprocket assembly **13**. This is true because in FIGURES 1, 3 and 6 through 9, the sprocket wheel **13** will be rotating counter clockwise, with the result that there would be a tendency for body **15** to rotate clock-wise were it not for the engagement of rear wheels **24** with surface **16** or **17** as the case may be.

It will be seen from the foregoing that there has been provided a new and improved type of climbing toy that is characterized by the presence of an automatic winding mechanism that precludes fouling, simultaneously simplifies winding and also it has been shown how the improved toy is further characterized by the fact that the same can be continuously operated in an uninterrupted path from one plane into another plane that is disposed at an acute angle therewith.

While a full and complete disclosure of the invention has been set forth in accordance with the dictates of the patent statutes, it is not intended that the invention be so limited.

Thus, while the invention is illustrated in connection with a simulated automobile, it is to be understood that the shape or design is not intended to be so limited, with the only requirement of shape being the presence of a rearwardly disposed portion that can prevent rotation of the body around the axis of the sprocket wheel during the time that the spring drive is under tension. Similarly, while the invention conveniently lends itself to being manufactured of plastic, it is to be understood that the same is not limited to being made of plastic material.

Accordingly, modifications of the invention may be resorted to without departing from the spirit hereof or the scope of the appended claims.

What is claimed is:

1. A self propelled device for movement across angularly disposed planar surfaces, comprising; a hollow body having bottom, front and rear portions; a shaft disposed interiorly of said body and extending transversely thereof adjacent said front portion; a plurality of gripping members arranged in a closed cyclic path of movement around the axis of rotation of said shaft and being disposed at a radial distance therefrom with said gripping members being adapted to support said body with respect to a planar surface; means for rotating said shaft and said gripping members in unison relatively to said body; said front portion of said body having an opening in its frontal edge; said gripping members moving through said frontal opening and projecting both forwardly of and beneath said body during rotation of said shaft, whereby the same may simultaneously engage angularly inclined surfaces that are disposed forwardly of and beneath said frontal edge, with said body advancing across said surfaces during said simultaneous engagement; the rotation of said gripping means effectuating temporary adherence between such surfaces and any one of said gripping means, whereby said body may be progressively advanced across said surfaces.

2. The device of claim 1 further characterized by the fact that said gripping members are suction cups.

3. A self propelled device for movement across angularly disposed planar surfaces, comprising; a hollow body having a bottom and front and rear portions; a shaft disposed interiorly of said body and extending transversely thereof adjacent said front portion; a plurality of gripping members arranged in a circular course around the axis of rotation of said shaft and being disposed at a radial distance therefrom with said gripping members being adapted to support said body with respect to a planar surface; said gripping members progressively engaging said surfaces during rotation of said shaft, whereby said body may be progressively advanced across said surfaces; compressible tensioning means interconnecting said body and said shaft and exerting rotational force on said shaft during compression thereof; a string wound around said

shaft and having an end portion thereof accessible from the exterior of said body; said string rotating said shaft and compressing said tensioning means upon unwinding from said shaft during withdrawal thereof from said body; said string being drawn towards rewound condition on said shaft in increments of movement that progressively occur in response to increments of progressive advance of said body.

4. The device of claim 3 further characterized by the fact that said shaft includes a tubular housing that concentrically encircles said shaft and receives said string in wound condition thereon.

5. The device of claim 4 further characterized by the presence of guide means for guiding said string onto said housing during rewinding thereof.

6. The device of claim 4 further characterized by the fact that said tensioning means include a coil spring encircling said shaft; at least a portion of said shaft being encircled by said housing whereby interference between said string and said spring is obviated.

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