April 30, 1968 REIJIRO ITO 3,380,656

DEVICE FOR IMPARTING HORIZONTALLY OSCILLATORY ROTATING MOVEMENT TO ARTICLES

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FIG. 1

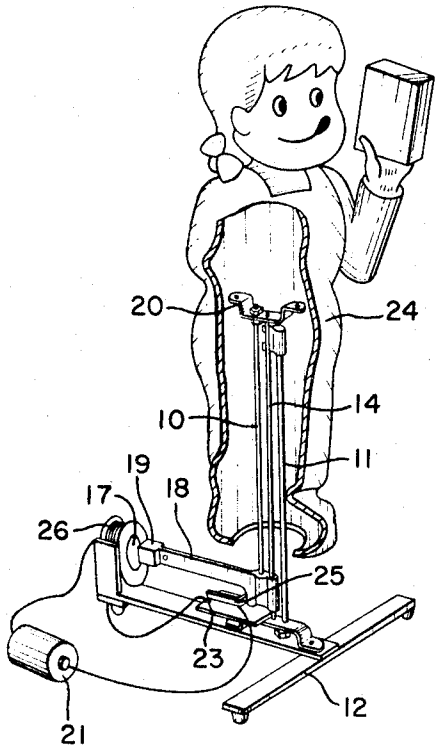


FIG. 2

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Original application Aug. 30, 1965, Ser. No. 483,404, now Patent No. 3,325,759, dated June 13, 1967. Divided and this application Jan. 30, 1967, Ser. No. 630,158

Claims priority, application Japan, Sept. 4, 1964, 39/70,100; Nov. 24, 1964, 39/90,996; June 16, 1965, 40/48,551; June 30, 1965, 40/39,871

2 Claims. (Cl. 335—229)

ABSTRACT OF THE DISCLOSURE

A device for imparting horizontal oscillatory movement to a display article mounted on an article mounting member movably mounted on a fixed base by a resilient means therebetween. A horizontal arm extends from the movable member and has a permanent magnet on the free end thereof. The fixed base has an electromagnet mounted thereon in opposition to the permanent magnet, in a rest position. Electrical contact means are provided on the fixed base and the movable member so that the electromagnet is energized through a closure of the contacts when the resilient means is in a rest condition to thereby impart a repulsive force to the permanent magnet thus causing oscillation of the movable member.

The present application constitutes a division of my earlier application Ser. No. 483,404 filed Aug. 30, 1965, and now issued as Patent No. 3,325,759.

This invention relates to improvements in a device for imparting horizontally oscillatory rotating movement to articles.

Conventional devices for imparting movement to articles of advertisement such as articles of commerce, outdoor signboards and chandeliers have been provided with power supply means consisting of an electric motor and a reduction gearing of complex structure and have therefore encountered various operating difficulties including a problem of providing successful wear resisting means in a turntable and reduction gears and a problem of overheat in the motor due to continuous operation for an elongated period of time. In order to deal with these difficulties, conventional devices of the kind described have necessarily become complex in their structure, required a high cost of manufacture and required troublesome procedures for the proper maintenance thereof.

Difficulties have been encountered especially with a device for imparting movement to outdoor signs in which case breakage of its reduction gearing or overheat of its electric motor has frequently taken place due to overload by wind and thus the device has become uneconomical and has been difficult to put into practical application.

It has been acknowledged that an interesting manner of advertisement can be derived by providing a device which imparts horizontally oscillatory rotating movement opposite to each other to two articles of advertisement, articles of commerce, decorative articles or the like. However, due to the fact that such device inevitably requires a complex mechanism including link means, gear means or belt transmission means, requires a high cost of manufacture and is liable to break, this kind of device could not be mass-produced.

The present invention intends to eliminate the prior drawbacks as described above and has for one of its objects to provide a device for imparting horizontally oscillatory rotating movement to articles in which a movable

support carrying thereon the articles such as articles of advertisement, articles of commerce or chandeliers is adapted to be moved by the combination of a force of repulsion or attraction between magnets and torsional movement of a resilient body carrying the movable support suspended therefrom so that the movable support is subjected to a interesting movement instead of mere constant-speed rotary movement and thus a great effect of display of the articles of advertisement can be obtained.

Another object of the present invention is to provide a device for imparting horizontally oscillatory rotating movement to articles in which a resilient suspension system is provided to support the movable support carrying thereon the articles such as articles of advertisement whereby load on the bearings for the movable support is reduced and the device of simple structure and of long service life can positively be utilized for use with outdoor signboards and the like.

A further object of the present invention is to provide a device for imparting horizontally oscillatory rotating movement to articles in which the movable support acting as an inner oscillator is freely rotatably mounted in an outer oscillator and at the same time carried in suspended relation in the outer oscillator by means of a resilient body while the outer oscillator is suspended from a stationary supporting member by means of an ineffective torque transmitting means such as a string or a chain so that the inner and outer oscillators make horizontally oscillatory rotating movement in directions opposite to each other and thus a device imparting a more interesting movement to the articles can be utilized for the purpose of advertisement or room accessories.

According to the present invention, the force for causing the rotary movement of the movable support or the inner and outer oscillators is generated by a combination of a force of repulsion or attraction between a permanent magnet or a magnetic body and an instantaneously energized electromagnet and a force of restitution of a resilient body against torsion. Therefore, power consumption is extremely small and rotary oscillation can be continued for a long period of time even with a source of power supply in the form of a battery.

The above and other objects, advantages and features of the present invention will become apparent from the following description with reference to the accompanying drawings, in which:

FIG. 1 is a partly cut away perspective view of an embodiment of the invention; and

FIG. 2 is an enlarged perspective view of some of the parts shown in FIG. 1.

Referring now to the drawings which illustrate an embodiment according to the invention, an upright **11** to serve as a stationary support is supported on bases **12**. A bar **14** of resilient material is firmly fixed at its upper portion to the upper end of the upright **11** by a fixing member **22**. Pins **13** and **15** extend upwardly and downwardly from the upper and lower ends of the bar **14**, respectively, with the pin **15** being rotatably received in a bearing plate **16** mounted on one of the bases **12**. A horizontally oscillatory arm **18** has one end thereof fixed to a lower portion of the resilient bar **14** and carries a permanent magnet **19** on its free end. An oscillatory rod **10** to serve as a movable support is fixed at its lower end to a portion near the fixed end of the oscillatory arm **18** and has its upper end firmly fixed to a mounting member **20** for an article of advertisement **24**. A bearing is provided centrally of the mounting member **20** to rotatably receive the pin **13** of the resilient bar **14**.

A stationary contact **23** and a movable contact **25** are provided on the base **12** and the oscillatory arm **18**, respectively, so that the latter contact is brought into contact with the former contact when the resilient bar **14**

takes its non-twisted position and exciting current from a battery **21** flows to an exciting coil **26** for an electromagnet **17** fixed on the base **12**. Since now the permanent magnet **19** is opposed by the electromagnet **17**, the force of repulsion between the magnets **19** and **17** generates a drive force to cause the oscillating movement of the arm **18**. Therefore, the oscillatory rod **10** makes oscillatory rotating movement about the resilient bar **14** by being guided by the pins **13** and **15** to cause oscillating movement of the article of advertisement **24** mounted on the mounting member **20**.

From the foregoing description, it will be understood that, in the device according to the present invention, the drive force for causing rotation of a movable body supporting an article of advertisement, an article of commerce, a chandelier or the like is derived from a combined action of the force of repulsion or attraction imparted by an electromagnet and torsional movement of a resilient body. Therefore, the movable body makes an interesting movement attracting the attention of viewers instead of the conventional constant-speed rotary movement and the resilient suspension system for the article of advertisement, etc., employed in the invention reduces load on the bearing. Thus, the inventive device having a simplified mechanism and a long service life can successfully be used with outdoor signboards. Further, it will be appreciated that, by virtue of extremely low power consumption, power supply means such as a battery can conveniently be used for operation over an extended period of time.

What is claimed is:

1. A device for imparting horizontally oscillatory rotating movement to articles comprising a base, an upright upstanding on said base, resilient means fixed at its upper portion to the upper end of said upright and depending downwardly with its lower end rotatably received in a bearing provided on said base, a horizontally oscillatory arm fixed at one end thereof to a lower part of said resilient means, magnetic means mounted on the free end of said oscillatory arm, an oscillatory rod fixed at its lower end to a portion of said oscillatory arm adjacent its fixed end, an article mounting member fixedly mounted on the upper end of said oscillatory rod and having a bearing to receive loosely therein the upper end of said resilient means, an electrical contact provided on said base, a corresponding electrical contact provided on said oscillatory arm, and magnetic means provided on said base, one of said magnetic means being energized through closure of said contacts in the non-twisted state of said resilient means to thereby impart force of repulsion to said other magnetic means.

2. A device according to claim **1**, in which said magnetic means mounted on said base is an electromagnet and said magnetic means mounted on said oscillatory arm is a permanent magnet.

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