Dec. 29, 1970 L. MacPHERSON 3,550,316

MAGNETIC AMUSEMENT DEVICE

Filed Dec. 11, 1969 2 Sheets-Sheet 1

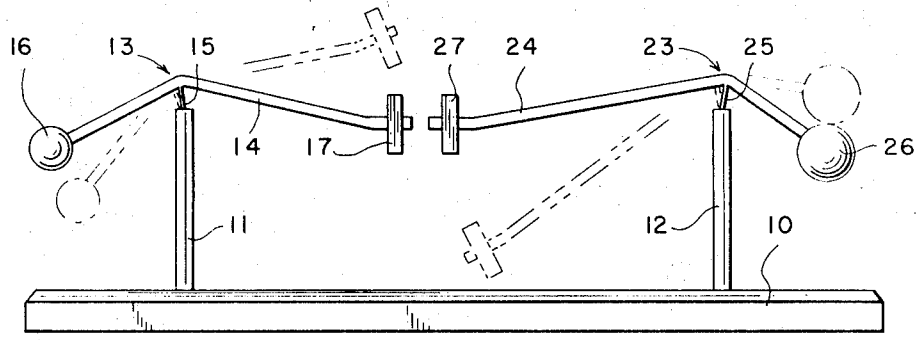


FIG. 1

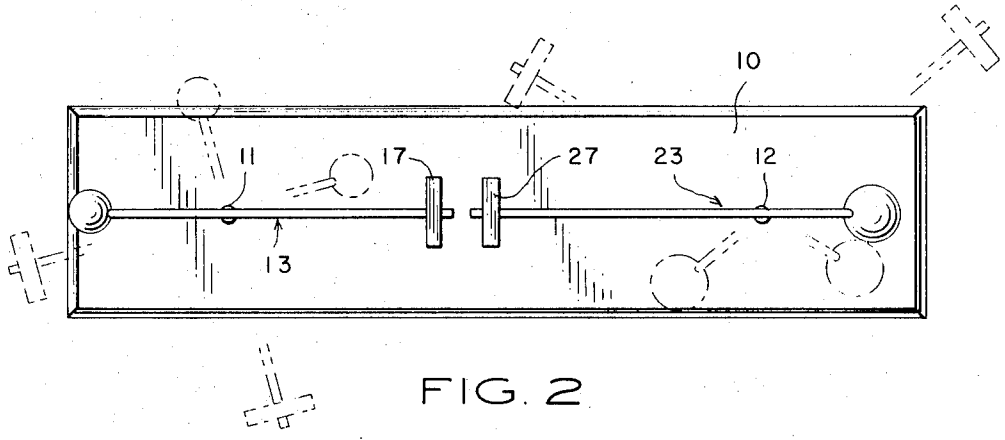


FIG. 2

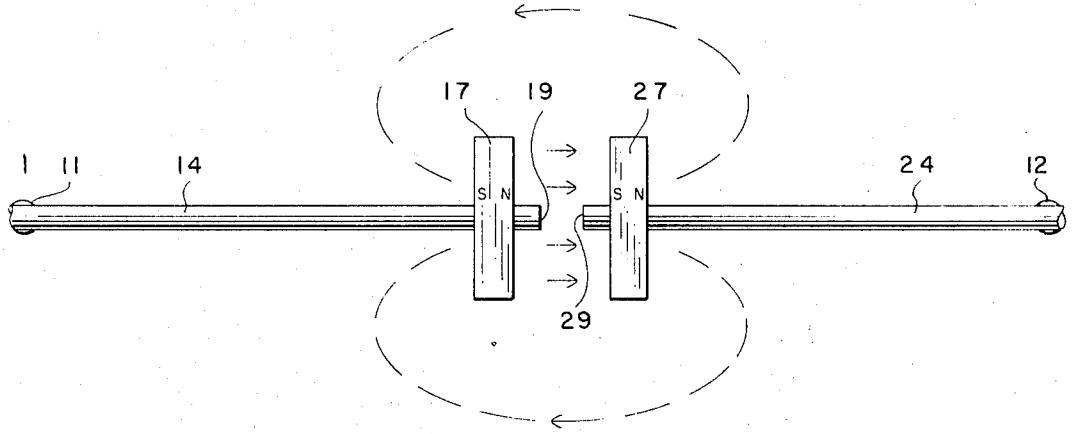


FIG. 4

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MAGNETIC AMUSEMENT DEVICE

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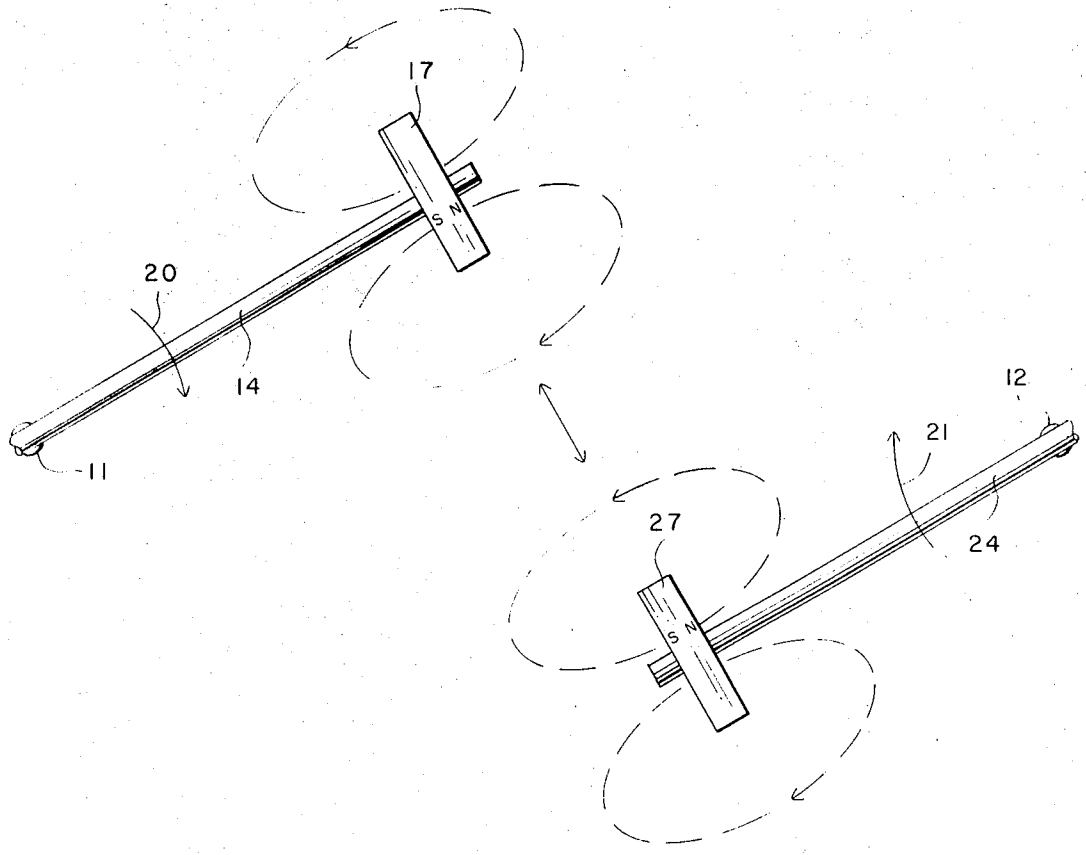


FIG. 5

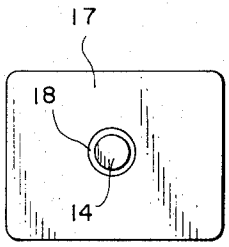


FIG. 3

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MAGNETIC AMUSEMENT DEVICE

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ABSTRACT OF THE DISCLOSURE

A pair of elongated balanced rotors are pivotally supported on laterally spaced pedestals to rotate without physical interference. Each rotor consists of an elongated rod with a weight at each end and a pivot boss between the ends. One weight for each rotor is a magnet oriented so that the magnetic fields of the two rotors interact with each other when the magnets approach each other to produce a change in relative motion.

BACKGROUND OF THE INVENTION

This invention relates to a magnetic amusement device wherein a pair of movable members react to each other responsive to magnetic fields produced by each member.

An object of this invention is to provide a novel amusement device.

Another object of this invention is to provide a novel amusement device including a pair of dancing members reacting to each other through magnetic fields.

A further object of this invention is to provide a novel amusement device demonstrating balance and magnetic attraction.

These objects are accomplished by a device including a pair of rotors pivotally supported on spaced pedestals. Each rotor includes an elongated member, a weighty mass at each end, and a pivot element between its ends. A magnet associated with each rotor produces a magnetic field at one end of each rotor, the magnetic fields interacting with each other when the magnets pass adjacent to each other to effect relative movement of the rotors.

DRAWING

The novel features of the invention, as well as additional objects and advantages thereof, will be understood more fully from the following description when read in connection with the accompanying drawing, in which:

FIG. 1 is an elevation view of an amusement device according to the invention;

FIG. 2 is a top view of the device of FIG. 1;

FIG. 3 is an end view of one rotor illustrating the configuration of the magnet;

FIG. 4 is a diagrammatic, fragmentary top view of elements of the device illustrating the interaction of the magnetic fields; and

FIG. 5 is another diagrammatic, fragmentary top view of elements of the device illustrating the interaction of the magnetic fields in another relative position of the rotors.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The over-all configuration and arrangement of a preferred form of amusement device according to the invention as shown in FIGS. 1 and 2 of the drawing. Referring to these figures, the device includes a base **10** in the form of a rectangular plate preferably fabricated from a plastic material for example. A pair of upright posts **11** and **12**, are affixed to the base in spaced relation to define pedestals for supporting the rotors to be described. The upper ends of the posts are preferably provided with dished recesses to support and retain the pivot elements for the respective rotors.

The two rotors **13** and **23** are similar in configuration

and appearance; however, the components of the respective rotors may have different dimensions as will be described. Since both rotors have the same components, the following detailed description of the rotor **13** and its components will be understood to represent a detailed description of the similar rotor **23**.

Referring to the rotor **13**, which is supported on the post **11**, this rotor includes an elongated rod **14** which is bent intermediate its ends to define an obtuse angle. A pivot boss **15** is affixed to the rod at the point of the bend, the boss being elongated and defining a pivot point to be supported by and retained within the conical recess of the post **11**. The boss **15** lies within the plane defined by the two legs of the angled rod **14** so that, in the supported position, the rod lies in a vertical plane with the legs angled downward from the boss **15**.

A steel ball **16** is affixed to one end of the rod **14** and a permanent magnet **17** is mounted at the opposite end of the rod. Both the steel ball and the magnet provide weighty masses at the ends of the rod which are heavy, relative to the rod, to produce the desired rotor motion. As seen in FIGS. 1, 2 and 3, the magnet **17** is preferably a flat or disk-like member having a rectangular outline, and being provided with a transverse hole for accommodating the rod **14**. Other forms of magnets, such as horse shoe magnets can be used however. The diameter of the hole is slightly larger than that of the rod; and the magnet is slidably secured on the rod, adjacent its ends, by means of a resilient plastic sleeve **18** which serves to maintain the magnet on the rod and to permit sliding movement to adjust the balance of the rotor **13**. The end of the rod **14** remote from the ball **16** is provided with a reverse bend to provide an end portion for supporting the magnet which is substantially horizontal when the rotor is supported on the pedestal. In the assembled relation, the rotor **13** will rotate about its pivot **15** on the post **11**, and the pivotal mounting will also permit oscillating or rocking motion of the rotor.

The companion rotor **23** consists of a corresponding elongated rod **24**, pivot boss **25**, steel ball **26** and magnet **27**.

FIG. 4 is a diagrammatic view of the magnet ends of the two rotors as viewed from the top of the device, with the magnet ends being aligned to their most proximate position as is also illustrated in FIGS. 1 and 2. As illustrated diagrammatically in FIG. 4, each of the magnets **17** and **27** is magnetized so that the opposite faces of the respective magnets define poles of opposite polarity. Also, the two magnets **17** and **27** are oriented relative to each other so that when the magnet ends of the rotors are in their most proximate position, as illustrated in FIG. 4, the confronting faces of the two magnets are of opposite polarity. With this arrangement, the magnetic fields interact whereby the magnets are attracted to each other to cause the rotors to come to rest in the equilibrium position with the magnets aligned as illustrated in FIG. 4.

The rods **14** and **24** are preferably fabricated of a ferrous material, increasing the coupling between the magnets. However, the rods can be of nonferrous material and similar alignment will be obtained in the equilibrium position as the result of the magnetic fields of the two magnets.

FIG. 5 is a diagrammatic illustration to illustrate the interaction of the magnetic fields as the magnet ends of the rods approach the fully aligned position of FIG. 4, as indicated by the directional arrows **20** and **21**. The magnetic forces, of course, are related to the relative positions of the magnets **17** and **27**, independent of the direction of rotation of the rotors. From the illustration of the direction of rotation of the magnets and the magnetic fields, it will be seen that as the magnets approach each other.

the fields interact to produce a repelling force which would tend to slow down or possible reverse the direction of rotor rotation. If the momentum of rotor rotation is sufficient to overcome this repelling force, the rotors will move into the aligned position of FIG. 4. Again, if the momentum is sufficient, the rotors may move past the aligned position to a position opposite from that illustrated in FIG. 5 wherein the repelling force is again effective to push the magnets apart. It will be seen then that as the magnet ends of the rotors move toward and away from each other, the interaction of the magnetic fields produces forces acting on the rotors to effect relative movement of the rotors.

As indicated above, the rotors **14** and **24** are preferably of different lengths, with the balls **16** and **26** having different weights and being mounted at different distances from the respective pivot bosses so that the individual rotors will rotate and rock or oscillate in an individual manner.

In the operation of the amusement device the rotors may be initially balanced and oriented in the positions of FIGS. 1, 2 and 4. One of the rotors is gently spun and this will produce rotation of both rotors in opposite directions. Depending upon the speed of rotation, the interaction of the magnetic fields will effect a transfer of inertial energy as the magnet ends pass adjacent to each other causing changes in speed of rotation, sometimes reversal of direction of rotation, and changes in the degree of rocking oscillation. Eventually, the magnetic fields will hold the magnet ends together preventing further rotation; and the rotors will dance in this generally aligned condition for a considerable time until the rotors settle to a static condition.

Although the invention has been described with reference to a particular preferred embodiment, many changes and modifications will become apparent to those skilled in the art in view of the foregoing description which is intended to be illustrative and not limiting of the invention defined in the claims.

What is claimed is:

1. A magnetic amusement device comprising:
a pair of spaced pedestals supported on a base;
a pair of rotors; each of said rotors comprising an elongated member having first and second ends, a first weighty mass fixed to a first end of said member, and pivot means intermediate the ends of said member for mounting the rotor for substantially horizontal rotation on respective pedestals;
said rotors having lengths so related to the distance between the pedestals that said rotors are rotatable without physical interference from each other;
a second weighty mass comprising a permanent magnet attached to the second end of each rotor for producing a magnetic field; said second ends of the two rotors moving sufficiently close to each other in their most proximate positions that the magnetic fields interact with each other to align the magnets in the equilibrium position and affect relative movement of the rotors when the magnets are in nonconfronting relationship.

2. A magnetic device as set forth in claim **1**
wherein each rotor includes one weighty mass slidably mounted on the elongated member for balancing the rotor.

3. A magnetic device as set forth in claim **1**
wherein said elongated member is bent to define an obtuse angle; and wherein said member pivot means is provided at the bend.

4. A magnetic device as set forth in claim **1**
wherein said permanent magnet defines the weighty mass at said second end of the member and the opposing faces of the permanent magnets when the two rotors are aligned are of opposite polarity.

5. A magnetic device as set forth in claim **4**

wherein said permanent magnet is slidably mounted on the member.

6. A magnetic device as set forth in claim **4**
wherein said permanent magnet comprises a flat member having a transverse aperture for accommodating the elongated member.

7. A magnetic device as set forth in claim **6**
wherein said elongated member, at said second end thereof, is fabricated of a ferrous material whereby the magnetic field produced by the magnet is concentrated in the member.

8. A magnetic device as set forth in claim **1**
wherein the elongated members of the two rotors are of different lengths; and wherein the weighty masses of the two rotors positioned at different distances from the respective pivot means.

9. As defined in claim **4**
wherein the weighty mass at the first end of each member is of nonmagnetic material.

10. As defined in claim **9**
wherein the weighty mass on the first end of one member is heavier than the weighty mass on the first end of the other member.

11. A magnetic amusement device comprising:
a pair of spaced pivot supports mounted on a base; a pair of rotors each comprising an elongated member, pivot means intermediate the ends of the member for mounting the rotor for substantially horizontal rotation on a respective pivot support, means defining a magnet at one end of the member, and balancing means at the other end of the member;
the length of each rotor elongated member between its magnet end and its pivot means being greater than its length between its pivot means and its balancing end, and the combined lengths of the rotor elongated members between the respective pivot means and the magnet ends being less than the distance between said pivot supports whereby said magnet ends may pass each other without physical interference; and said magnet ends of the two rotors moving sufficiently close to each other in their most proximate position that the magnetic fields interact with each other to effect the movement of the rotors.

12. A magnetic amusement device as set forth in claim **11**
wherein the lengths of the two rotor elongated members, between the respective pivot means and the magnet ends are dissimilar.

13. A magnetic device as set forth in claim **11**
wherein the confronting faces of the magnets of the two rotors are of opposite polarity, when the magnets are in their most proximate position.

14. A magnetic device as set forth in claim **11**
wherein said balancing means for each rotor includes a weighty mass spaced from the pivot means thereof; and wherein said weighty masses are of different weights and are spaced at different distances from the respective pivot means.

15. A magnetic device as set forth in claim **14**
wherein each rotor elongated member is formed to define an obtuse angle; and wherein each rotor pivot means is provided at the apex of the obtuse angle whereby said elongated member is supported in a generally vertical plane.

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U.S. Cl. X.R.
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