

[54] **AIR MOTION APPARATUS**

[76] Inventor: **Arthur L. Revor**, 3433 W. 117th St., Merrionette Park, Ill. 60655

[22] Filed: **May 18, 1972**

[21] Appl. No.: **254,564**

[52] U.S. Cl. **40/39, 46/58**

[51] Int. Cl. **G09f 11/02**

[58] Field of Search **40/39-40, 212, 40/214; 46/47, 53, 56-58**

[56]

References Cited

UNITED STATES PATENTS

598,479	2/1898	Hoover	40/39 X
1,380,325	5/1921	Schlirf	46/58
3,009,273	11/1961	Gessmann	40/39
963,165	7/1910	Meyers	40/39
1,566,739	12/1925	Estes	40/39

FOREIGN PATENTS OR APPLICATIONS

1,261,839	4/1961	France	40/39
610,266	10/1948	Great Britain	46/57

Primary Examiner—Robert W. Michell

Assistant Examiner—A. J. Heinz

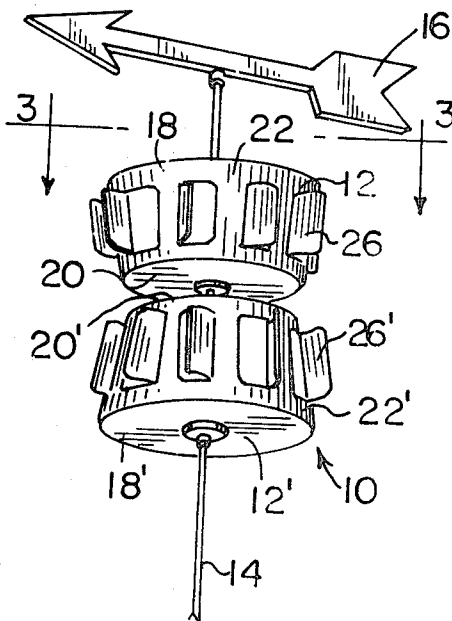
Attorney, Agent, or Firm—Robert E. Wagner; Robert E. Browne

[57]

ABSTRACT

An air motion apparatus particularly adapted to move in response to air currents in a fascinating and eye-appealing manner, having a body means formed from a generally frusto-conical container mounted on a spindle means for rotation about the central axis thereof. The body means has formed in or attached to its peripheral side surface a series of elongated vane means which may be slightly curved in transverse cross section and which serve to catch air currents due to wind motion or heat and thereby impart a rotation to the body means about the central axis of the spindle. A plurality of body means mounted on a spindle means, the vane means of each adjacent body means being pitched in opposite directions so that adjacent body means will rotate in opposite directions about the spindle.

2 Claims, 4 Drawing Figures



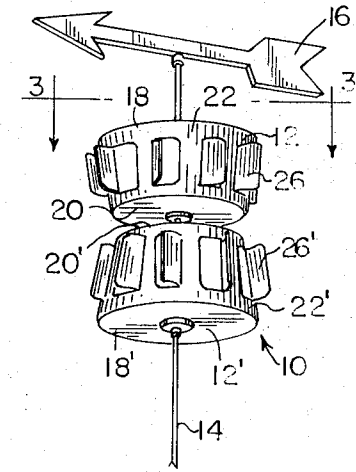


FIG. 1

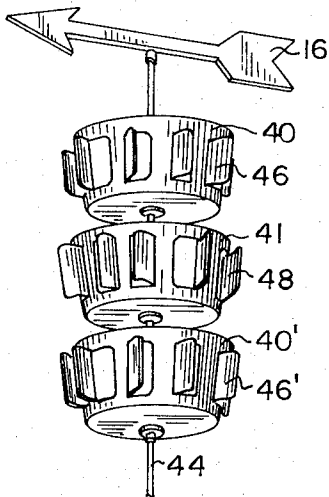


FIG. 4

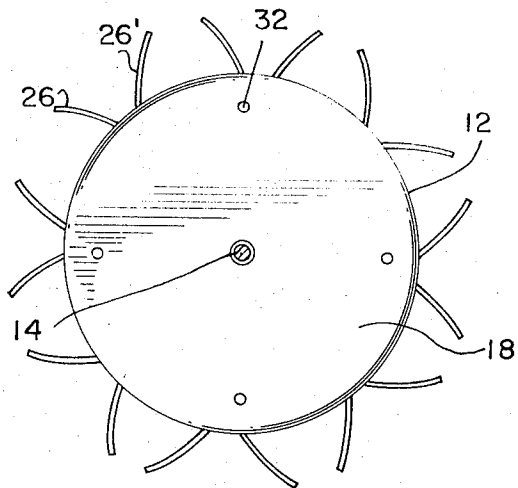
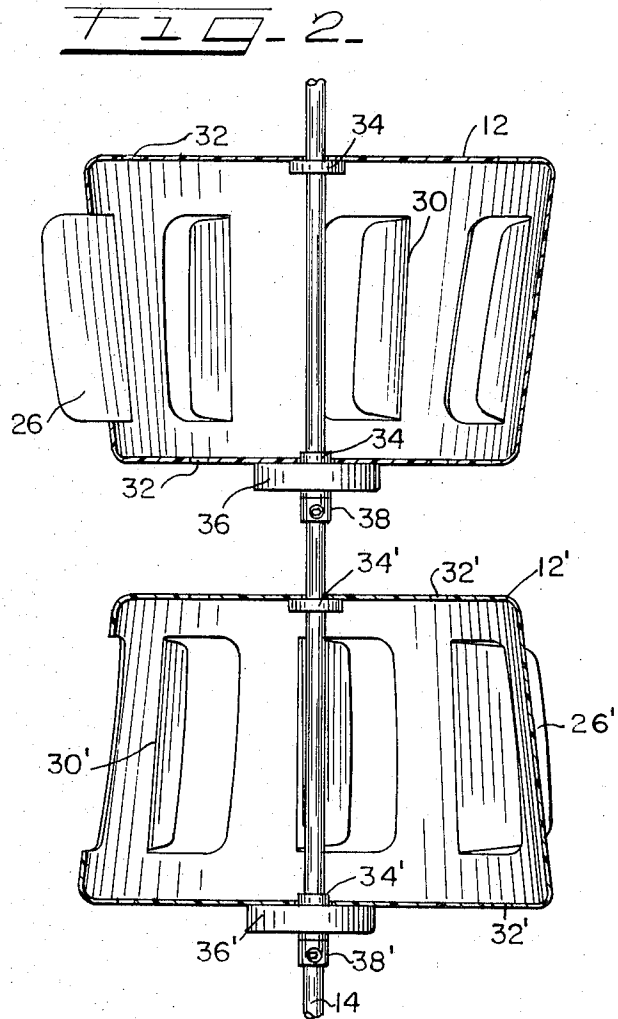


FIG. 3

AIR MOTION APPARATUS

BACKGROUND OF THE INVENTION

This invention generally relates to apparatus caused to rotate by air currents, and, in particular, is directed to a novel apparatus having containers which rotate in opposite directions under the influence of such currents.

Windmills, display devices, propellers and other toys and novelty items which are caused to rotate about a central axis under the influence of wind or hot air currents are well known. Examples of such devices are shown by U.S. Pat. No. 1,580,601 to A. Hugill, U.S. Pat. No. 1,600,450 to L. D. Aronson, and U.S. Pat. No. 2,795,894 to T. E. Hughes. Such devices usually have been directed to a specific function, such as use as a toy or an automobile ornament. These devices may also present such an appearance that they are not useful for general display near a home or private residence, as well as a business.

DESCRIPTION OF THE INVENTION

The present invention involves a device which is attractive, colorful, appealing to the eye, and because of its unique construction, fascinating to watch while in motion. While this invention is colorful and creates attention so that it is useful in business displays, it is tasteful and not haphazard in appearance, as previous wind devices, so that it is suitable for permanently mounting near a private residence or the like.

This invention has one or more body means in the form of hollow containers having top, bottom and side peripheral surfaces, which are mounted on a vertical spindle means for rotation about a central axis of the spindle means. The rotation of each container is accomplished through a plurality of vane means or flaps which are disposed about the side peripheral surface of the container so as to present a surface area extending normally to any existing air currents and thereby impart a rotation to the container in the direction of the force exerted on the vane surface by the air currents. Where a plurality of containers are mounted on a spindle, the adjacent containers preferably have their vane means or flaps pitched in opposite directions so that these adjacent containers will rotate in opposite directions, since the air currents, such as a wind, will impart an opposite lift and rotation to the oppositely-pitched vanes.

The spindle is preferably mounted in a vertical position on a mast, or pole, such as are commonly found on mobile home canopies, carports, garages, near swimming pools, on boats and the like, and will usually have a balanced wind-directional arrow mounted on its top and free to rotate about its central axis to indicate the direction of the wind.

The vane means, top surfaces of the containers, and the arrow may be painted with various colors to give this invention an extremely appealing and eye-catching appearance. The structure of this invention, including the large container body and the vanes positioned around its sides, also provides a neat and compact appearance which may be tastefully used, as described above, in locations where the common and often gaudy windmill or propeller-type devices would not be in good taste.

The vanes disposed around the side peripheral surfaces of the body or container of this air motion apparatus may be formed from the side surfaces of the containers themselves by cutting the vanes out of the surface and bending them over to give them a permanent pitch, or may be molded integrally with the container, or may be formed separately and mounted about the side surface of the container.

Accordingly, it is an object of this invention to provide an air motion apparatus which is attractive, colorful, eye-appealing and fascinating to watch while in motion.

It is also an object of this invention to provide an air motion apparatus which is neat and tasteful in its constructed appearance so that it may be permanently located near private residences and the like.

It is another object of this invention to provide an air motion apparatus which rotates in response to air currents.

It is still a further object of this invention to provide an air motion apparatus which has elements rotating in opposite directions under the influence of air currents.

It is one more object of this invention to provide an air motion apparatus in which rotation is imparted to container means mounted on a spindle through a series of pitched vane means disposed around a side surface of the container means.

These and other important objects of the invention will become apparent from the following description taken in conjunction with the drawings illustrating preferred embodiments wherein:

FIG. 1 is a perspective view of the air motion apparatus of this invention having two container means mounted on a spindle for opposite rotation around the central axis thereof;

FIG. 2 is an enlarged elevational cross-sectional view of the air motion apparatus shown in FIG. 1 and taken generally along the central axis thereof;

FIG. 3 is a top plan view of the air motion apparatus shown in FIG. 1; and,

FIG. 4 is a perspective view of a second embodiment of this invention showing a series of three container means mounted for rotation on a spindle means.

Referring now to the drawings and, more particularly to FIG. 1, one embodiment of the air motion apparatus of this invention is shown generally at 10. Air motion apparatus 10 has two similar and adjacent body means or containers 12 and 12' mounted for rotation on a spindle 14 which is disposed through their centers. A wind directional arrow 16 is mounted at the upper end of spindle 14 and rotates freely about the central axis of the spindle under the influence of the wind, to add attractiveness and eye appeal to the apparatus 10. Each of the containers 12 or 12' mounted on spindle 14 is generally frusto-conical in configuration having a top surface 18 or 18' containing a major axis and a bottom surface 20 or 20' containing a minor axis. The containers 12 and 12' are mounted on the spindle 14 so that their bottom surfaces 20 and 20' are adjacent, thereby providing an eye-appealing symmetrical arrangement and reducing manufacturing costs, as will be explained below.

Each container 12 or 12' also has a side peripheral surface 22 or 22' having a plurality of vanes or elongated flaps 26 or 26' formed out of it or mounted on it. These flaps 26 or 26' extend outwardly from the side peripheral surface 22 or 22' of their respective contain-

ers 12 or 12' to provide a wing-like surface blocking the free flow of any available air currents. Such air currents will therefore impinge upon the surfaces of flaps 26 and 26', causing the containers 12 and 12' to be rotated about the central axis of spindle 14.

It is significant that the vanes 26 on container 12 are disposed or pitched in an opposite direction relative to the central axis of spindle 14 from the corresponding flaps 26' on the adjacent container 12', as is more clearly shown in FIGS. 2 and 3. In FIG. 2, the vanes 26 are disposed about the periphery of the upper container 12 are pitched in a counterclockwise direction on the side peripheral surface 22 with respect to the central axis of spindle 14. The bottom container 12', however, has a series of vanes 26' which are pitched or opened in a clockwise direction on its side peripheral surface 22' with respect to the same central axis of the spindle 14.

In this manner, a wind moving from left to right across the face of the drawing will cause the upper container 12 to rotate about the central axis of spindle 14 in a clockwise direction, and the lower container 12' to rotate about the same axis in a counterclockwise direction. Such opposite rotation occurs because the wind moves with a greater velocity across the top or outside surface of the vanes 26 and 26' than across the inside surface or the area between the vanes 26 and 26' and the containers 12 and 12', thus impinging upon the inside surface of the vanes and imparting a lift, as in an airplane wing, to the vanes and the container to which they are attached. This lift pushes against the pitch of the vane and therefore moves containers 12 and 12', having oppositely pitched vanes 26 and 26', in opposite directions.

This lift is improved by formation of each vane 26 and 26' in a curved manner, as shown in FIG. 3. The curve increases the impinging force of the air current against the undersurface of the vane 26 or 26', imparting a greater rotation to the connected container 12 or 12'.

While the vane means or flaps 26 and 26' are shown in the preferred embodiment illustrated by these drawings as formed integrally with the side peripheral surfaces 22 and 22' of their respective containers 12 and 12', it is clear that such vane means 26 and 26' could be formed from a separate sheet of material and mounted about the side peripheral surfaces 22 and 22' of containers 12 and 12', at the pitch desired, by a holding means or by complementary interlocking tab and slot means formed on the container means 12 and 12' and the vane means 26 and 26'. As integrally formed with containers 12 and 12', however, the vanes or flaps 26 and 26' are simply cut out of the side peripheral surfaces 22 and 22' of the containers 12 and 12' or molded with these containers 12 and 12'. If they are cut out, they should be bent approximately 180° out of their original plane, at which point they are held for a certain period of time, such as overnight. It has been found that when the flaps 26 and 26' are released from this position, they will return to a new position forming an acute angle with their respective side peripheral surfaces 22 and 22' and remain permanently in this new position. If the vanes 26 are molded integrally with the container 12, it is evident that by inverting container 12, as shown in FIGS. 1 and 2, so that its bottom surface 20 faces upward, container 12', having vanes 26' is obtained. Thus, it is possible to use one mold to form an apparatus 10 having two containers 12 and 12',

since, by inverting container 12 to obtain 12', the vanes will be automatically reversed in pitch to obtain vanes 26'.

The vanes 26 may be formed with or mounted on the container 12 so that their line of junction 30 with the side peripheral surface 22 of the container 12 is generally parallel with the vertical central axis of the spindle 14. On the other hand, they may also be formed so that their line of junction 30 forms a definite angle with respect to this central axis. A variation in vertical orientation of the line of junction 30, which corresponds to the axis of elongation of the vanes 26, will act to vary the speed of rotation of the container 12 and the appearance of the apparatus 10.

In the preferred embodiment of this invention shown in FIGS. 1-3, the container 12 is of frusto-conical configuration, as described above. However, it is clear that the container 12 could be generally cylindrical in configuration thereby altering the general appearance of the apparatus 10 while obtaining a similar rotational effect. In using either container configuration, it is desirable to have drain holes 32 formed in both the top surface 18 and bottom surface 20 to provide a means of draining water out of the container 12, so that the apparatus 10 may be used outdoors without requiring constant maintenance.

The containers 12 and 12' are preferably mounted on the spindle 14 in a manner such that friction is substantially reduced. Therefore, as shown in FIG. 2, plastic bushings 34 are disposed in the openings formed in the top surfaces 18 and bottom surface 20 of the container 12 at the center point, where the spindle 14 is disposed through the container. The bushings 34 may be molded integrally with or attached to the container 12 at these openings. The bushing 34 adjacent the lower spindle opening in each container 12 and 12' is then attached to a ball bearing wheel 36, such as a roller skate wheel, which permits revolution of the container 12 about the spindle 14 without substantial loss of momentum due to friction. The ball bearing wheel 36 is journaled to a steel collar 38 having an adjustable diameter, such as an Allen screw, which is positionable vertically on the spindle 14 to maintain the container 12 and associated ball bearing wheel 36 in a determined vertical position and in spaced relationship to the adjacent container 12'.

A second embodiment of this invention is shown in FIG. 4, in which three containers 40, 41 and 40' are mounted in spaced relationship on a spindle 44. The vanes or flaps 46 and 46' on the top and bottom containers 40 and 40', will have the same pitch since containers 40 and 40' are essentially the same. The center container 41 will be formed so that its vanes 48 will be pitched in an opposite direction to those of containers 40 and 40'. Thus, the center container 41 will be caused to rotate in a direction opposite to the top and bottom containers 40 and 40', respectively. The principles of the embodiment shown in FIG. 4 are otherwise the same as those described above.

The outwardly extending vanes or flaps and the surfaces, such as the top surface of each container, present ideal surfaces for displaying insignia or advertising or for painting various colors to enhance the appearance and eye appeal of this invention.

It is clear that the containers, vanes and other elements forming this invention may be scaled to any size so that the air motion apparatus as described above

would be suitable for use near residences in one size or for mounting on bicycles and other vehicles in a smaller scale.

The spindle, roller bearing and collar used in this air motion apparatus may be formed of any suitable material which is durable and corrosion-resistant, such as stainless steel or chrome-plated metals.

The containers, including the vanes or flaps, may be formed of any suitable material which is durable, corrosion-resistant and light in weight, to reduce friction and increase rotation, such as polyethylene and other plastic materials.

While the invention has been described in relation to preferred embodiments thereof, it will be apparent to those skilled in the art that the structural details are capable of wide variation without departing from the principles of the invention.

I claim:

1. A decorative air motion apparatus particularly adapted to move in response to air currents in a fascinating and eye-appealing manner, including a stationary, generally vertical spindle, at least two hollow, frusto-conical containers mounted on said spindle, each of said containers being rotatable about a central axis of said spindle, each of said containers being similar in size and shape and having a first surface and a second surface formed by generally horizontal, vertically spaced, generally parallel planes, said first surface having a lesser diametral dimension than said second surface, said first surface and said second surface of each of said containers being joined by a continuous side surface disposed about and connecting a peripheral boundary of each of said first and second surfaces, each of said containers having openings formed in said first and second surfaces near a center portion of each surface to allow said spindle to be inserted into said openings and through each of said containers, each of said containers having an upper sleeve bearing and a lower roller bearing mounted in the opposite openings formed in said surfaces disposed to surround and engage the spindle to reduce friction and allow each of said containers to rotate freely about said spindle, said containers being mounted on said spindle in opposed, mirror-image positions such that their first surfaces face one another while being maintained in a desired spaced relationship on said spindle relative to one another

other by clamp means mounted on said spindle in stationary positions relative to said spindle and beneath each of said containers, each of said clamp means engaging and supporting said lower roller bearing mounted on each of said containers, each of said containers having a plurality of successively and uniformly spaced flaps disposed around said side surface thereof, each of said flaps being elongated in a generally vertical direction and projecting outwardly relative to said central axis a slight distance from said side surface, each of said flaps being pitched at an angle relative to said side surface of each of said containers such that said flaps on one of said adjacent containers is oriented in an oppositely opening direction relative to said flaps on the other of said containers by reason of the opposed, mirror-image mounting of said containers on said spindle to allow the adjacent containers to rotate about said central axis of said spindle in opposite directions under the influence of air currents impinging upon said flaps.

2. The air motion apparatus of claim 1 wherein a third hollow, frusto-conical container of similar size and shape to each of said oppositely mounted containers is mounted on said spindle for rotation around said central axis thereof, said third frusto-conical container having a first surface, a second surface of larger diametral dimension than said first surface, and a continuous side surface connecting said first and second surfaces about their peripheries, said third frusto-conical container being maintained in spaced relationship to an adjacent one of said oppositely mounted containers by a third clamp means mounted in a stationary position on said spindle beneath said third frusto-conical container and engaging a lower roller bearing mounted on a surface of said third frusto-conical container, said third frusto-conical container having a plurality of successively and uniformly spaced flaps disposed around its side surface, each of said flaps being elongated in a generally vertical direction and projecting outwardly a slight distance from said side surface, said third frusto-conical container being oriented relative to the immediately adjacent frusto-conical container such that the disposition of said flaps on said side surface of said third frusto-conical container will cause it to rotate in the direction opposite that of said immediately adjacent container.

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