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Van Wagenen et al.

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[54] **ROTATING SIGN STRUCTURE**

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[52] **U.S. Cl.** ..... **40/33,** 40/77.4, 40/145 R

[51] **Int. Cl.** **G09f 11/10**

[58] **Field of Search** ..... 40/33, 77, 77.4, 145 R, 40/49, 44, 39

[56] **References Cited**

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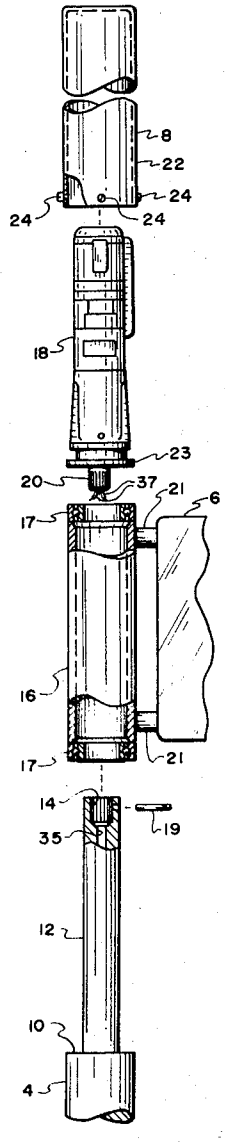
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Assistant Examiner—John F. Pitrelli
Attorney, Agent, or Firm—Lynn G. Foster

[57] **ABSTRACT**

A rotating sign structure comprising a sign supporting structure, a power source mounted adjacent the top of the supporting structure, a rotatable drive sleeve interposed between the power source and the supporting structure, means securing the power source to the sleeve, and a shaft extending from the power source engaging and secured against rotation to the supporting structure. The sleeve is rotated by the motor in respect to the supporting structure. A sign is mounted on the sleeve and projects assymmetrically therefrom. Method and several modifications are disclosed.

13 Claims, 7 Drawing Figures



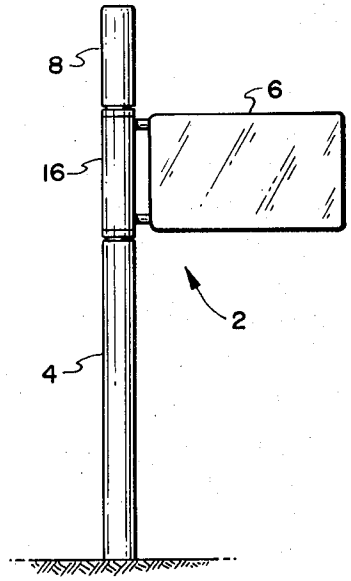


FIG. 1

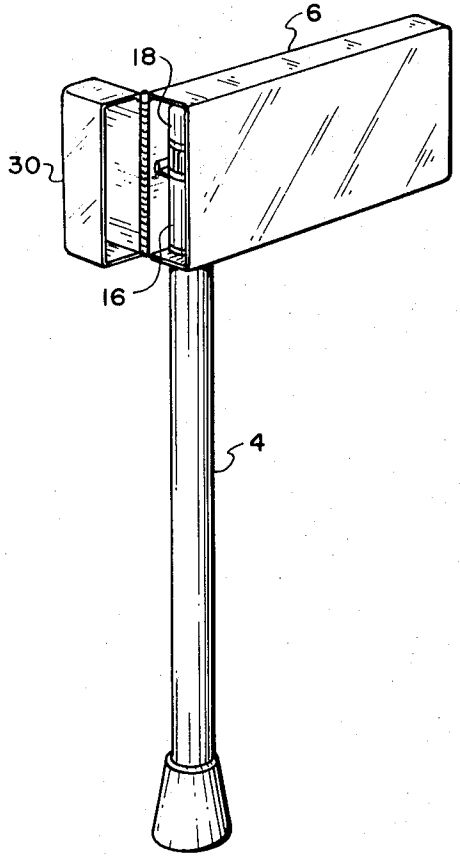


FIG. 4

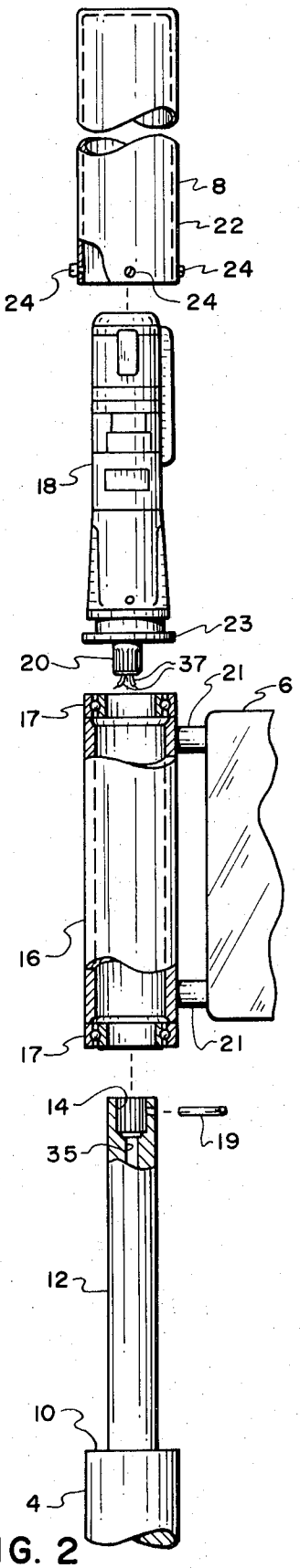


FIG. 2

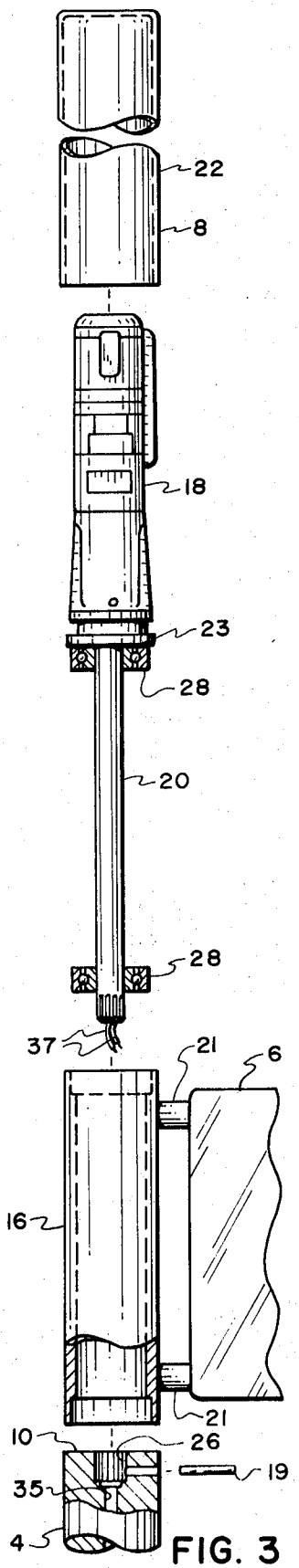


FIG. 3

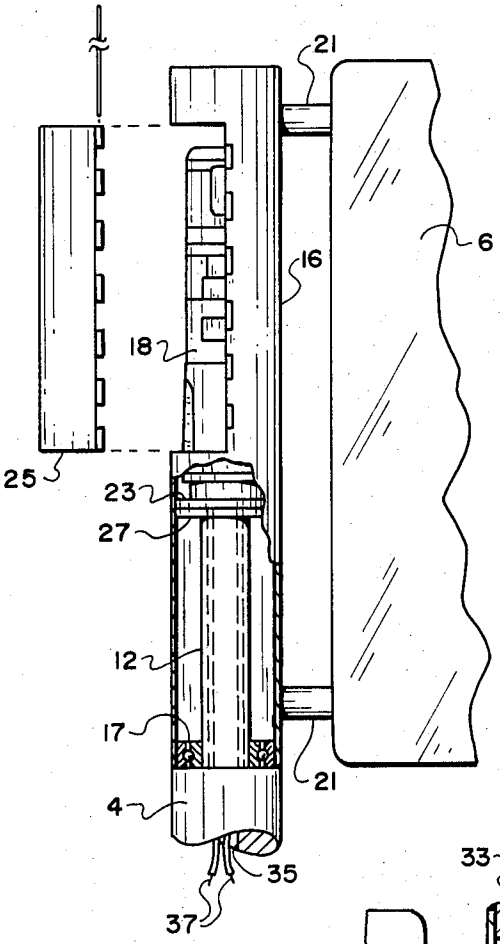


FIG. 5

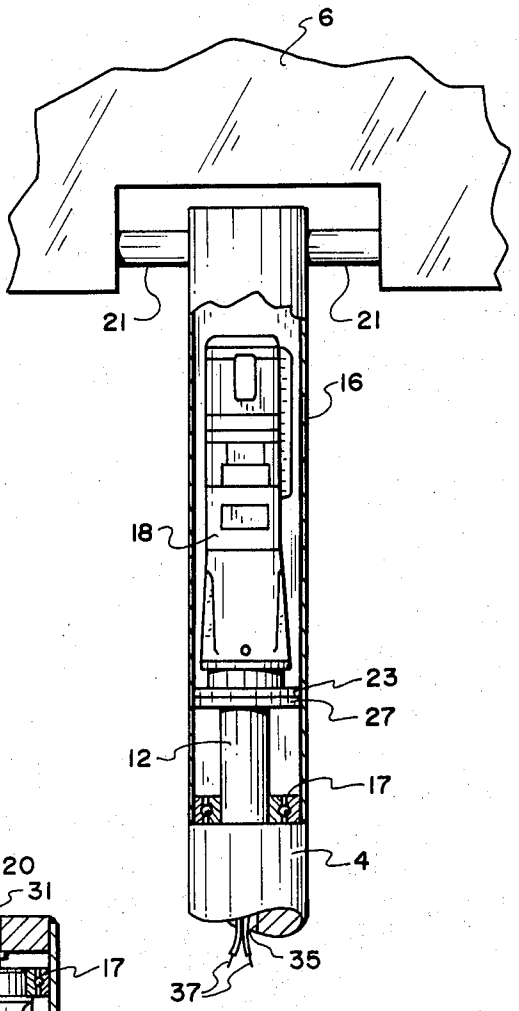


FIG. 6

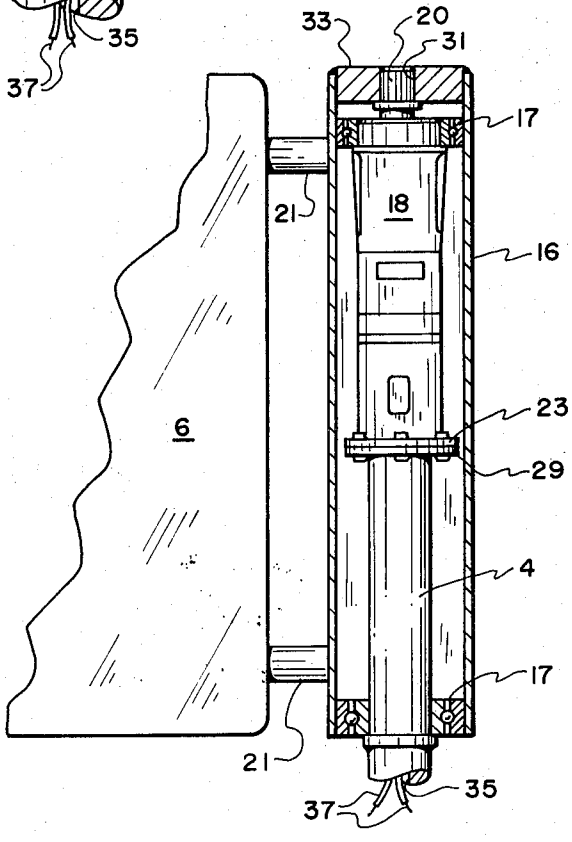


FIG. 7

ROTATING SIGN STRUCTURE

BACKGROUND

1. Field of Invention

This invention relates to advertising signs and is particularly directed to advertising signs having elevated power means for rotating the sign mounted above a pole upon a drive sleeve.

2. Prior Art

In recent years, fluid motors and other power sources have been developed which have made it possible to rotate large advertising signs and the like. Frequently, such signs are mounted on the top of tall poles or towers which may extend 20–30 feet or more above the surface to which they are secured. Conventionally, the power source is mounted at the base of the pole and drives the sign by means of a long shaft which extends up the interior of the supporting pole. Obviously, this arrangement requires that bearings of some sort be disposed to journal the shaft at appropriate points within the pole. Moreover, when maintenance of the power source requires that the power source be removed, the task of disassembly becomes most arduous. Furthermore, the shaft is highly susceptible to being bent or twisted as a result of wind action on the sign and, when this occurs, considerable time, effort and expense are required to remove and repair or replace the shaft.

It is also known to mount a motor upon a pole such that the motor is directly connected to an elevated sign and causes the sign to rotate as the casing of the motor rotates. Serious alignment problems and unacceptable eccentricities have made this approach unpopular. More specifically, rotation where axial alignment is imperfect causes a flexing of the sign due to rigid weldments.

Prior art proposals for revolving sign assembly have not provided for ease in removing the sign per se from the pole or other supporting structure. In some cases the pole must be cut down to remove the sign.

In connection with this, it has been conventional heretofore to design rotary signs to be symmetrical about the supporting pole in order to provide a balanced load while the sign is driven. However, contrary to heretofore accepted design standards, it has been found that, in winds having a magnitude equivalent to the torque exerted upon the sign, the sign will turn broadside into the wind, whereupon the force of the wind acts upon the entire surface of the sign which greatly increases the likelihood of damage to the sign, with a substantial likelihood that the motor will burn out, unless equipped with a feature which accommodates motor rotation without sign rotation.

BRIEF SUMMARY AND OBJECTS OF INVENTION

These disadvantages of the prior art are overcome with the present invention and a rotating sign construction is provided wherein the power source is mounted above the sign as, for example, within the sign or in a removable housing. Thus, the disadvantages of a long drive shaft are overcome and the design of the supporting pole or tower is freed from the requirement of protecting such a drive shaft. A drive sleeve removes problems growing out of misalignment between the power source and the sign. By such a configuration, the power source can be conveniently and rapidly removed, repaired and/or replaced. Also, the sign per se can be easily installed and removed without need to dismantle. In addition, the present invention provides a non-symmetrical sign which, in high winds which equal or exceed the rotational power of the assembly, will "weathervane" or turn to be coplanar with the direction of the wind. This greatly reduces the load on the supporting structure and the likelihood of damage.

The advantages of the present invention are preferably attained by mounting a power source adjacent the upper end of a sign supporting structure, interposing a sleeve in non-rotatable driving relation between the power source and a sign, and in rotatable relation with the sign supporting structure.

Accordingly, it is a primary object of the present invention to provide an improved rotatable sign assembly.

Another important object of the present invention is to provide a rotatable sign structure employing an elevated power source.

An additional significant object is the provision of a rotary sign having a drive sleeve non-rotatably interposed between an elevated sign and an elevated power source.

A further object of the present invention is to provide a rotatable sign structure which provides easy access to the power source for relatively easy removal, replacement and/or maintenance.

It is another paramount object to provide a revolving sign assembly wherein the sign may be installed or removed from supporting structure without dismantling the sign.

An additional object of the present invention is to provide a rotatable sign structure wherein the supporting structure is not required to house and protect the drive shaft.

Another object of the present invention is to provide a rotating sign structure employing a sign which is assymetrical with respect to the axis of rotation.

These and other objects and features of the present invention will be apparent from the following detailed description, taken with reference to the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a side elevation of a rotating sign structure embodying the present invention;

FIG. **2** is an exploded view with parts broken away for clarity, of the sign structure of FIG. **1**;

FIG. **3** is a view, similar to that of FIG. **2**, showing an alternative form of the invention of FIG. **1**;

FIG. **4** is an isometric view of another alternative form of the invention of FIG. **1**, with parts open for clarity;

FIG. **5** is an elevational view with parts broken away for clarity, of still another embodiment of the present invention;

FIG. **6** is an elevational view with parts broken away for clarity, of an additional embodiment of this invention; and

FIG. **7** is a cross-sectional representation of one more embodiment of the invention.

DETAILED DESCRIPTION OF ILLUSTRATED EMBODIMENTS

In that form of the present invention chosen for purposes of illustration in FIG. **1**, a rotating sign assembly,

indicated generally at 2, is shown having a supporting tower 4, a rotating sign 6, a motor housing 8 and a drive sleeve 16. As seen in FIGS. 1 and 2, the supporting tower 4 is provided with a bearing surface 10 and has a reduced diameter cylindrical projection 12 which extends upward from the surface 10 and has a splined recess 14 formed in the upper end thereof. The rotatable drive sleeve 16, having bearings 17 journaled at the upper and lower ends thereof, mates telescopically with the cylindrical projection 12 and seats on the surface 10. The inner race of each bearing is locked to the projection 12. The top bearing 17 is locked by pin 19 to the cylindrical projection 12. The sign 6 is non-rotatably secured to the sleeve 16 by mounting connectors 21 and projects assymmetrically therefrom. A motor 18, which may be the motor disclosed in our copending U.S. Pat. application, Ser. No. 178,028, filed Sept. 7, 1971, is rigidly, non-rotatably secured to the upper end of the sleeve 16 at the outer race of the top bearing 17 and has a splined shaft 20 which non-rotatably mates with the recess 14 in the upper end of the projection 12. The pin 19 fits within a blind bore (not shown) in splined shaft 20 to insure non-rotatability. Of course, other suitable motors and/or drive arrangements could be used. The protective housing 8 comprising a hollow cylinder 22 is disposed about the fluid motor 18 and is removably secured as by screws 24. Wires 37 from the motor 18 pass through bore 35 of the projection 12, which continues through the pole 4, to a source of electrical energy. Bearing configurations not requiring a stepped pole or shaft can also be used. It is to be appreciated that the assembly 2 provides exceptional strength with the entire length of the sleeve interiorly directly supported upon two bearings by projection 12 whereby misalignment is of no consequence.

In use, when the motor 18 is actuated, the motor 18 per se rotates. Since the shaft 20 is secured against rotation by engagement with splined recess 14 of the projection 12 of the supporting structure 4, the motor 18 itself rotates about the shaft 20 and, since the motor 18 is non-rotatably secured at flange 23 to the outer race of the top bearing 17 and said outer race is in turn non-rotatably secured to the sleeve 16, causing sleeve 16 and the sign 6 to rotate. If the wind should develop sufficient force to overcome the rotational ability of the motor 18, or if the motor 18 should fail, the assymmetric mounting of the sign 6 will allow the sign 6 to "weathervane" or turn so that the sign is coplanar with the direction of the wind. Thus, the wind force applied to the assembly 2 including the supporting structure 4 will be minimized and the likelihood of damage will be greatly reduced. It is to be appreciated that, in addition to the field of signs, the illustrated embodiments of the present invention have application to the fields of agitators, carnival rides, exercise apparatus, and the like.

FIG. 3 illustrates an alternative technique for mounting the sign 6 and motor 18 on the supporting structure 4. In this form of the invention, the projection 12 is eliminated and a splined recess 26 is formed in the bearing surface 10. The shaft 20 is made long enough to extend completely through the sleeve 16 to mate with recess 26 and bearings 28 are mounted adjacent the upper and lower ends of the shaft 20. Pin 19 aids in non-rotatably coupling the shaft 20 to the pole 4 in the manner hereinbefore indicated. The sleeve 16 and the motor flange 23 are non-rotatably secured to the outer race of the top bearing 28 and the sleeve 16 fits telescopically about the bearings 28. The inner race of each bearing is locked to shaft 20. The sign 6 is non-rotatably secured to the sleeve 16 and projects assymmetrically therefrom. In use, this form of the invention is as described earlier in conjunction with FIGS. 1 and 2. Wires 37 from the motor 18 pass through bore 35 of pole 4 to a source of electrical energy.

FIG. 4 illustrates an additional form of the present invention. In this form, the motor housing 22 is eliminated and the sign 6 is made to enclose the motor 18. An access door 30 is provided in the sign 6 to facilitate maintenance of the motor 18.

FIG. 5 illustrates one more embodiment of the present invention. In this embodiment the motor 18 is concealed within the sleeve 16, the sleeve 16 being provided with an access door 25 at one side for maintenance, removal and/or replacement of the motor when and if necessary. The motor flange 23 is non-rotatably fastened to a mounting platform 27 which is non-rotatably anchored to the sleeve 16. The reduced diameter extension 12 of the pole 4 extends loosely through an aperture (not shown) in the platform at 27 and is splined and pin secured to the shaft 20 (not shown in FIG. 5) as heretofore explained. The sign 6 is non-rotatably secured by connectors 21 to the exterior of the sleeve 16 in the manner described earlier. The operation of the assembly of FIG. 5 is substantially identical to the operation of the embodiments heretofore described in connection with FIGS. 2 and 3.

FIG. 6 illustrates one more embodiment of the present invention which is substantially identical to the embodiment of FIG. 5 except that the sign 6 is secured to the sleeve 16 near the top thereof. Otherwise the structure and operation of the embodiment of FIG. 6 is substantially identical to that of FIG. 5.

The embodiment of FIG. 7 illustrates the motor 18 enclosed within the sleeve 16 and non-rotatably secured at flange 23 to an upper flange 29 at the top of the pole 4. Thus, the motor 18 is constrained against rotation itself. Bearings 17 are located within the sleeve 16 near the top and bottom thereof and respectively engage at their inner race the motor housing and the exterior of the pole, respectively. The drive shaft 20 projects upwardly and is spline connected at 31 to a drive disc 33. Drive disc 33 is anchored non-rotatably by a weldment or the like to the interior of the sleeve 16. Thus, rotation of the drive shaft 20 will turn the drive disc 33, the sleeve 16 and the sign 6 which is non-rotatably anchored by connectors 21 to the exterior of the sleeve 16.

It is to be appreciated that the present invention can be used with signs and the like other than those mounted upon a ground-engaging pole. For example, the sign and drive mechanisms of this invention can be cantilever-mounted to a building.

Obviously, numerous other variations and modifications may be made without departing from the present invention. Accordingly, it should be clearly understood that the forms of the present invention described above and shown in the accompanying drawings are illustrative only and are not intended to limit the scope of the invention.

What is claimed is:

1. An outdoor revolving sign assembly subjected to weather including heavy wind loads comprising:

a sign to be rotated;

rigid cantilevered supporting structure the distal end of which is free and extends to a substantial height into the air and the proximal end of which is permanently non-rotatably anchored at an anchoring site;

power means carried adjacent the distal end of said supporting structure;

a rotatable sleeve of substantial length coaxial with the supporting structure rotatably carried upon spaced bearing structure by said supporting structure adjacent the free distal end thereof said sleeve being non-rotatably directly connected at the exterior thereof by load transferring structure to the sign;

rotating drive means of the power means directly physically non-rotatably fastened by first fastener means to said sleeve for unitary rotation of the drive means and the sleeve together upon said sleeve bearing structure under force of the power means; and

stationary means of the power means non-rotatably directly physically non-rotatably fastened by second fastener means to the free distal end of the supporting structure.

2. The assembly of claim **1** wherein said cantilevered supporting structure comprises:

a load transferring surface at the anchoring site located at the proximal end of the supporting structure;

a cylindrical intermediate portion extending upward from said load transferring surface;

an upper free end; and

a spline recess formed in the upper free end configured to non-rotatably mate with said stationary means of the power means.

3. The assembly of claim **1** wherein:

said sign comprises a display area assymmetrical with respect to the axis of rotation.

4. The assembly of claim **1** wherein the sign is disposed above the power means.

5. The assembly of claim **1** wherein the motor is situated within the sleeve.

6. The assembly of claim **1** wherein the power means and sleeve are in tandem relationship.

7. The assembly of claim **1** wherein drive means of said power means comprise a rotating housing and the stationary means of the power means comprises a stationary shaft.

8. The assembly of claim **1** wherein the rotating drive means of said power means comprises a rotating shaft and the stationary means of the power means comprises a stationary housing.

9. A method of erecting a rotating sign comprising the steps of:

erecting a cantilevered supporting structure which is anchored against displacement of any kind at its proximal end and projects into the air;

mounting power means adjacent the distal end of the supporting structure so that a first direct connection non-rotatably physically joins a stationary part of the power means to the upper free end of said supporting structure;

rotatably disposing an elongated rotatable sleeve of substantial length coaxially upon bearing structure carried by said supporting structure adjacent the upper free end thereof; and

non-rotatably directly connecting a rotating part of said power means to said elongated sleeve for common rotation at all times when rotation occurs.

10. The method of claim **9** comprising the further step of:

non-rotatably securing a sign by structural members to an exposed portion of said sleeve for common rotation therewith in a manner to cause the area of said sign to be situated in assymmetrical relationship in respect to said sleeve.

11. The assembly of claim **1** wherein the power means and the sleeve are enclosed within the sign; and

further comprising an access door formed in said sign to permit access to said power means and sleeve.

12. The assembly of claim **1** wherein the sign is mounted by the load transferring structure to and horizontally adjacent the exterior of the sleeve and wherein the sleeve extends to an elevation above the power means.

13. A revolving sign assembly comprising:

a sign to be rotated;

a stationary non-rotatable assemblage comprising:

an elongated stationary cantilever support having a distal region extending into the air to a substantial height;

mounting means to rigidly anchor the proximal end of the support against movement of any kind;

shaft means of reduced transverse dimension rigidly and stationarily integral with the distal region of the support; and

a stationary portion of power means rigidly and stationarily integrally fastened to the shaft means; and

a power rotating assemblage comprising:

an elongated sleeve rotatably mounted to the stationary assemblage upon bearing structure in the vicinity of said distal region, said elongated sleeve at least in part rotatably surrounding and concealing the stationary shaft means; and

a power rotated portion of the power means rigidly integrally fastened to said elongated sleeve for common rotation at all times when rotation occurs;

said sign being rigidly joined by load transferring structure to the elongated sleeve and extending outward beyond the elongated sleeve.

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