April 17, 1956 F. H. ROE 2,741,861

DEVICE FOR REVOLVING ELECTRICAL SIGNS

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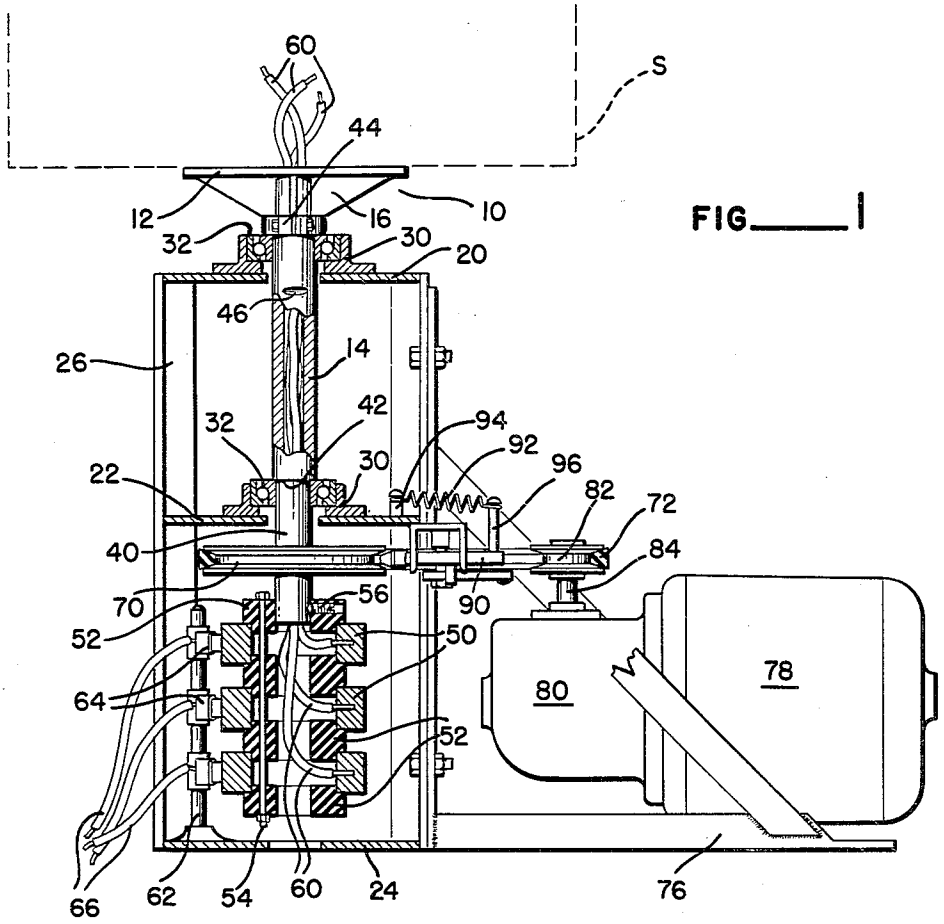


FIG. 1

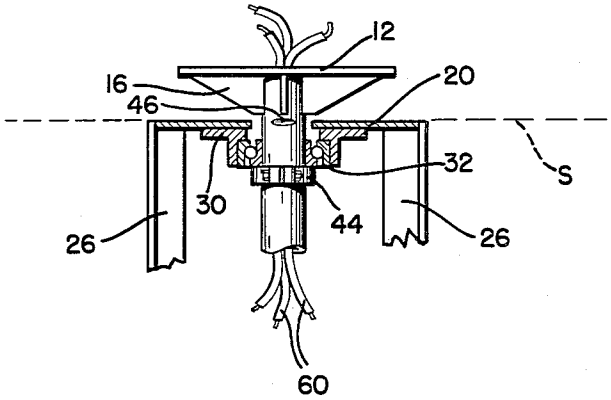


FIG. 2

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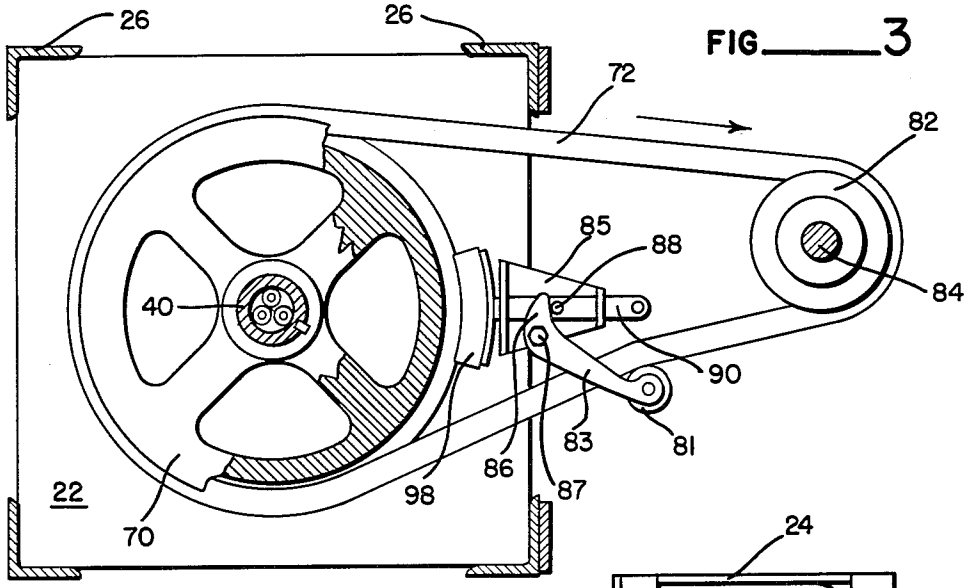
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DEVICE FOR REVOLVING ELECTRICAL SIGNS

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FIG 3



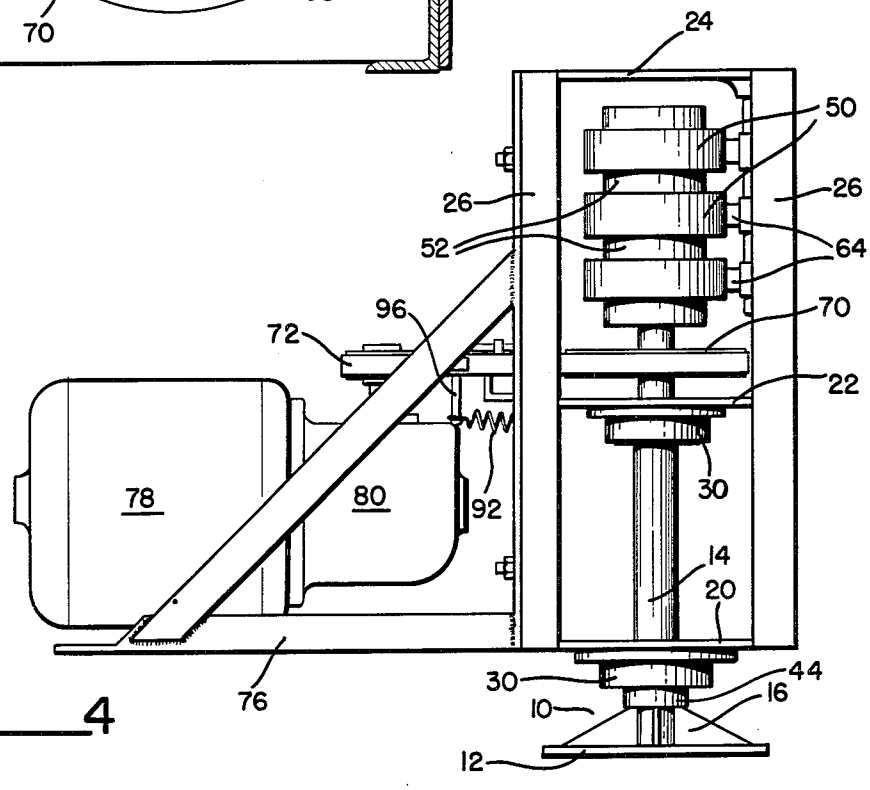


FIG 4

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DEVICE FOR REVOLVING ELECTRICAL SIGNS

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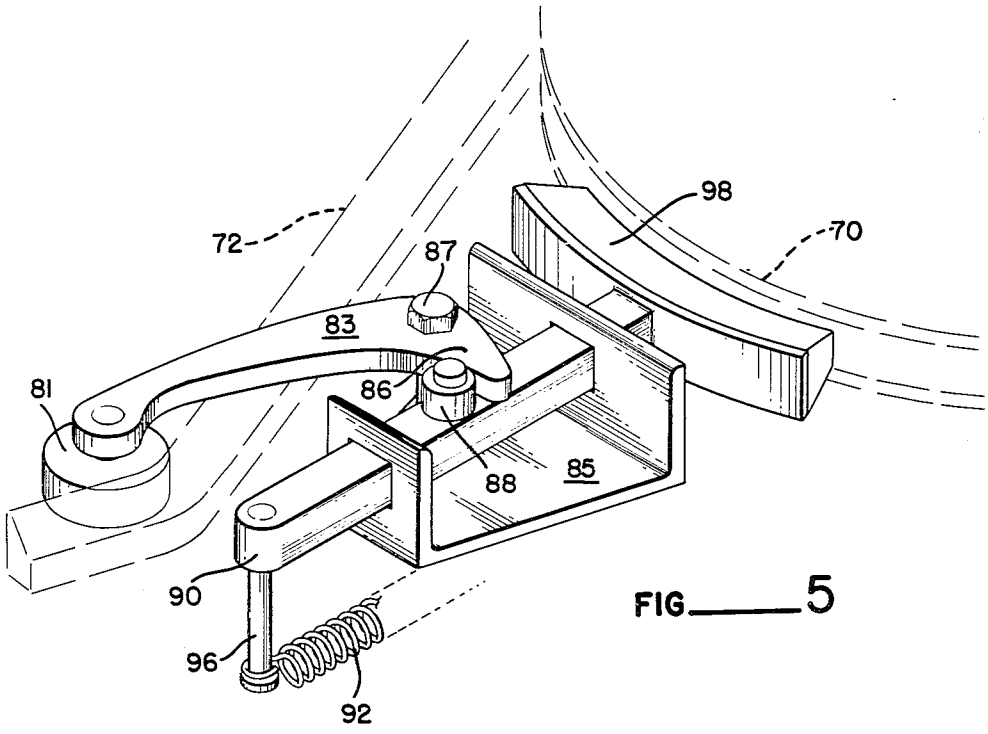


FIG. 5

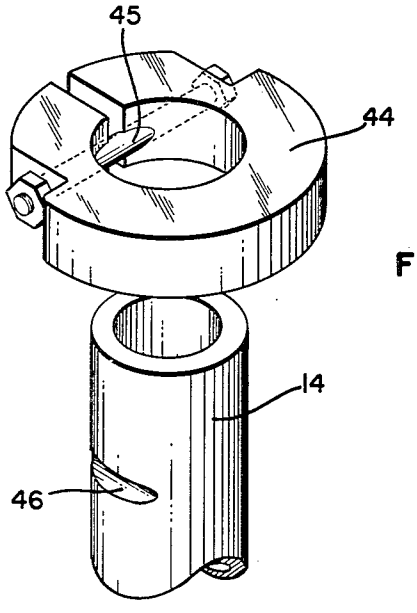


FIG. 6

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DEVICE FOR REVOLVING ELECTRICAL SIGNS

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Application July 21, 1953, Serial No. 369,460

2 Claims. (Cl. 40—33)

This invention relates to illuminated sign construction and, more particularly, to a device for revolving electric signs. The essence of this device is the provision of a unit which can be built into an electric sign, or other display devices, or into a supporting tower for such a sign, and which will at the same time provide (1) a rugged construction which will resist wind and other forces acting upon the sign; and (2) which will readily permit the servicing of the drive motor or other power applications; and (3) which locates the commutator rings supplying power to the sign in such a way that they can be readily serviced, installed, or modified, without dismantling the sign. This latter feature includes locating the commutator rings outside of the bearing housing for the sign and the supporting of the structure by openwork columns so as to afford access to the rings.

One type of outdoor advertising or identification of a business is in the form of a revolving sign. For certain purposes in advertising and display a comparable situation exists indoors in which a large sign or display rack is revolved about a vertical axis. However, the present structure is designed principally for outdoor work. It will be understood that for a large sign having a range of size of spaces, for example between 16 and 200 square feet in area, a rugged construction is required merely to rotate the sign for daily use. This problem is greatly aggravated in outdoor use when winds up to 60 miles per hour are not uncommon. The sign must be rotated against the resistance of the wind, and furthermore when not in use, or in severe winds, must be locked against rotation. Otherwise it will be understood that in excessive winds the sign could be rotated so rapidly as to set up vibration and stresses which the rotating mechanism and supporting base could not withstand.

The sign driving and current supply means must be adequately protected from the weather but at the same time it must be arranged for convenient access and maintenance. A sign of this type must be of such construction as to permit of regular maintenance, and as it is frequently subject to change or modification of displays, also requires different circuits to be established in the sign. Therefore it is important to provide ease of accesss to the parts, including the possibility of removing parts subject to corrosion or wear, when it is desirable to work on them in a shop. This is true of various parts and it is especially true of the commutator rings or the like.

As in other applications, it is desirable to employ standard units capable of use in various types of installations in order to reduce the cost of manufacture; and this is especially true in revolving signs where the volume, as to the various types of installation, is small and in which the problems of installation are quite varied.

An object of the invention is therefore to provide a device for revolving electrical signs which is readily adaptable to various types of installation.

Other objects of my invention include the provision of means for revolving an electrical sign which is sufficiently rugged to withstand outdoor use; to devise means to hold

the sign in position when it is not to be revolved, and to include secondary safety braking means which will secure the sign if the primary locking means fails; to devise a type of construction in which ready access is had to the various parts which may require maintenance in the rigors of outdoor use, and to include provision wherein parts requiring considerable maintenance, or of a type which it is desirable to remove for maintenance, are of easy access; and to provide a construction for a sign revolving means whereby the drive may be held stationary and the sign driven, or the drive may revolve, about a fixed base carrying the sign with it.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is an elevational view, partly in section, showing a specific embodiment of my device for rotating an electric sign, in this installation the rotating means being fixed and the sign to be rotated being shown in dotted lines;

Figure 2 is an elevational view in fragmentary form, and partly in section, showing an installation in which the rotating means is part of the sign and is located relative a fixed base;

Figure 3 is a horizontal sectional view looking upward showing details of the driving and braking means;

Figure 4 is an elevational view showing the rotating means forming a part of the sign, and supported by a fixed base from below;

Figure 5 is a perspective view, in fragmentary form, showing details of the brake structure; and

Figure 6 is an exploded perspective view of the shaft sleeve and the shaft used in my device.

This device is designed to work in a number of types of installation in which the sign may be supported from above and below. The sign may be supported by a base fixed to the ground, can be hung under another larger fixed sign, may be supported on a marquee to extend upwardly therefrom, may be supported to rotate on the top of an old sign, or may have actual bearing both top and bottom of the rotating sign. As the unit including the motor and commutator assembly must be protected from the weather, it is preferred to build the sign around the mechanism rather than to have it a part of a fixed base. However the device is designed to accommodate various situations, as shown in the drawings, in which in Figure 1, the sign S is supported by a fixed base including the rotating means; and in Figure 2, the rotating mechanism is formed as a part of the sign S and hung from a fixed supporting surface; and in Figure 4, the assembly is formed as part of the sign and supported from below by a fixed base. It has been found that by providing three sizes of revolving units, as 50, 90, and 120 pounds respectively, most types of signs can be accommodated which have space areas of 16–100 and 200 square feet respectively. A convenient method of figuring whether a light, medium, or heavy duty unit is required, is in terms of foot-pound stress at the bearings of the revolving unit. The foot-pound stress is figured by multiplying the square feet in the sign (height by width) times the leverage (center of sign to bearing in unit) times 30 pounds (wind pressure per square feet at 60 miles per hour).

For convenience of reference, the built-up plate construction **10** is referred to as the base even though it may be part of the fixed or rotating assembly; the base includes a plate **12** of ½ inch material welded to a tubular sleeve shaft **14**, and braced by gusset plates **16**. Shaft **14** is rotatively mounted relative a frame construction including three spaced apart plates **20, 22, 24**, which may be of identical construction and four spaced apart

columns formed of angle iron welded to the plates. Removably secured to plates 20, 22 is a pair of annular rings 30 supporting the outer race of anti-frictional bearings 32. It will be understood that these bearings also act as one-way thrust receiving means and support the weight of the sign as well as acting as journal bearings. For this reason it is preferred to secure rings 30 to plates 20, 22 by bolts so that by positioning the rings and bearings on the opposite faces of plates 20, 22, as shown by the comparison of Figures 1 and 2, the assembly is accommodated to various types of installation. These parts may be positioned in the desired relationship in the plant or may be changed into the desired position in the field.

One of the important features of this construction is the complete support of the sign by the bearings 32, rings 30, plate 20, 22 and columns 26. It is not uncommon that these parts require maintenance, particularly removal for repair or alteration, and all of the structure which is subject to frequent repair alteration and maintenance may be said to be in cantilevered relationship to these fixed bearings, i. e., the driving mechanism and the commutator assembly. This has not been true in prior installations and this change will be understood to be quite advantageous.

To provide for alternate suspension of the drive unit, means are provided so that the thrust load may be accepted in either direction. The tubular shaft portion 14 is preferably of a larger diameter than the continuation 40, which is of reduced diameter, serving to form a shoulder for the tube to transfer thrust to the bearing on plate 22. On the other hand the bearing on plate 20 has its inner race diameter the same as shaft portion 14 and thrust is received by a ring sleeve 44 which includes clamping means, such as a compressing bolt, to secure it in position on shaft 14 in either the position shown in Figure 1 or Figure 2. Sleeve 44 is secured in place by a bolt 45 running through it and engaging a notch 46 in shaft 14 as in the position shown in Figure 2.

On the other free end of reduced shaft portion 40 is a commutator ring assembly. This includes a plurality of commutator rings 50, three being shown, supported on shaft 40 by a series of interspaced dielectric annular members 52, having grooved recesses to receive commutator rings 50, so that the commutator slip rings have a press fit thereon. A plurality of bolts 54 secures the metallic and dielectric rings in place. Set screw 56 secures the inboard annular member 52 in place on shaft 40.

The number of feed lines 60 varies according to the requirements of the sign and the number of commutator rings is varied accordingly, although three would be required for a 220-volt circuit. The end of feed lines 60 are inserted between the non-conductive spacer rings 52 and are soldered in slip rings 50. A standard 62 carries a plurality of spring-pressed electrical brushes 64 connecting with insulated wires 66. It is a common complaint with slow turning signs that the brush becomes "hung up" and fails to contact the current conductor rings. This may be due to gumming of lubricants, oxidation, dust accumulation or the like. To insure good brush-ring contact, I form the outer surface of the rings 50 slightly eccentric to their axis of rotation. Thus the spring-pressed brushes 64 are constantly working in and out in their holders in a manner to preclude their sticking out of contact with the rings.

The drive means includes a sheave 70 secured on shaft portion 40, an endless flexible drive belt 72, from there on the construction is either a resilient belt or a chain and sprocket drive. The power means is supported from the side of the frame on a bracket construction 76 and includes a motor 78, gear box 80, and sheave 82 on drive shaft 84. By having the power means to the side, servicing and repair should be accomplished without disturbing the relationship of the parts within frame members 26.

When power is not applied to the motor, a self-locking type of gear assembly is used in gear box 80, such as the worm drive, which will secure drive shaft 84 against rotation and will hold the shaft 40 against rotation through the drive assembly including belt 72 and sheaves 70, 82. However in the past there has been trouble with drives of this type where, under heavy rains, the drive means such as belt 72 may be broken, and the sign rotated by the wind at such excessive speed as to cause forces and vibrations in the assembly which rip the sign loose from its base. For this reason auxiliary braking means has been provided serving in addition the purpose of a belt tightener for the flexible drive 72. This brake includes a roller 81 mounted on a cam arm 83 pivoted on bolt 87 to a fixed plate 85 and having a cam end 86 acting on a pin or preferably a roller 88 mounted on a sliding bolt 90. Bolt 90 is biased toward its inner position by spring 92 acting between a fixed pin 94 on the frame 22 and pin 96 on bolt 90. Secured to the inboard end of bolt 90 is a brake shoe 98 adapted to seat in the belt groove of sheave 70. Shoe 98 is normally held out of braking position by means of roller 81 acting on belt 72 by means of cam arm 83 acting on bolt 90 against the urging of spring 92. This assembly acts as a belt tightener and in the event of breakage of the belt 72 the brake shoe is dropped inward by spring 92 so as to brake sheave 70 and hold the sign from rotating. The strength of spring 92 may be varied according to the needs of installation.

When the revolving unit is formed as part of a sign, most of the parts requiring maintenance are free to be worked on because of the openwork formed by column 26 permitting removal and rearrangement of parts because of the cantilevered construction including the drive means and commutator assembly and the positioning of the power means outside of the frame 26. Some type of protective housing either supplied by the sign or in the base is used to protect the parts from the weather, but the housing can be constructed so as to afford ready access to these parts. The construction is readily adaptable to various types of installations. Safety means has been provided to protect against damage to the sign in heavy winds. The various objectives of the invention appear thus to have been met.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of a device for revolving electrical signs.

Having thus disclosed the invention, I claim:

1. A device for revolving illuminated signs, comprising: an openwork frame formed by first, second and third parallel, superimposed, vertically-separated plates arranged serially and a plurality of upright columns securing together said plates at their edges with the space between the plates and columns open providing access for maintenance, a hollow shaft extending through said first and second plates and having an unsupported end cantilevered between the second and third plates and terminating less than half the distance to said third plate, said shaft being located substantially on the axis of the openwork frame and each of said first and second plates carrying an antifriction thrust bearing supporting said shaft for rotation and abutment means on said shaft engaging the bearings against vertical movement through the force of gravity, the other end of said shaft being adapted to be connected to a body to have relative rotary movement with said frame, the cantilevered end of said shaft supporting secured thereto and extending beyond in a cantilevered manner a plurality of commutator rings between the shaft and the third plate, the rings being insulated from said shaft, means associated with said frame supporting electric brush means in contact with the commutator rings, electrical conductors extending from said commutator rings through the interior of said hollow shaft past said first and second plates to be connected to electrical means in said body, electromechanical sign re-

volving means supported by bracket means on said frame outside of the space between said plate and column and means connecting the sign revolving means to said shaft between said second and third plates to rotate the same.

2. A device for revolving illuminated signs, comprising: an openwork frame formed by first, second and third parallel, superimposed, vertically-separated plates arranged serially and a plurality of upright columns securing together said plates at their edges with the space between the plates and columns open providing access for maintenance, a shaft extending through said first and second plates and having an unsupported end cantilevered between the second and third plates and terminating less than half the distance to said third plate, said shaft being located substantially on the axis of the openwork frame and said first and second plates carrying antifriction thrust bearings supporting said shaft for rotation and abutment means on said shaft engaging the bearings against vertical movement between the shaft and frame through the force of gravity, the other end of said shaft being adapted to be connected to a body to have relative rotary movement with said frame, the cantilevered end of said shaft supporting secured thereto and extending beyond in a cantilevered manner a plurality of commutator rings between the shaft and the third plate, the rings being insulated from said shaft, means associated with said frame supporting electric brush means in contact with the commutator rings, electrical conductors extending from said commutator rings along said shaft past said first and second plates to be connected to electrical means in said body, electromechanical sign revolving means supported by said frame on a bracket outside of the space between said plate and column and means connecting the sign revolving means to said shaft to rotate the same.

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