June 17, 1941. R. U. SEARES 2,245,940

ANIMATING MECHANISM FOR SIGNS

Filed March 11, 1939 2 Sheets-Sheet 1

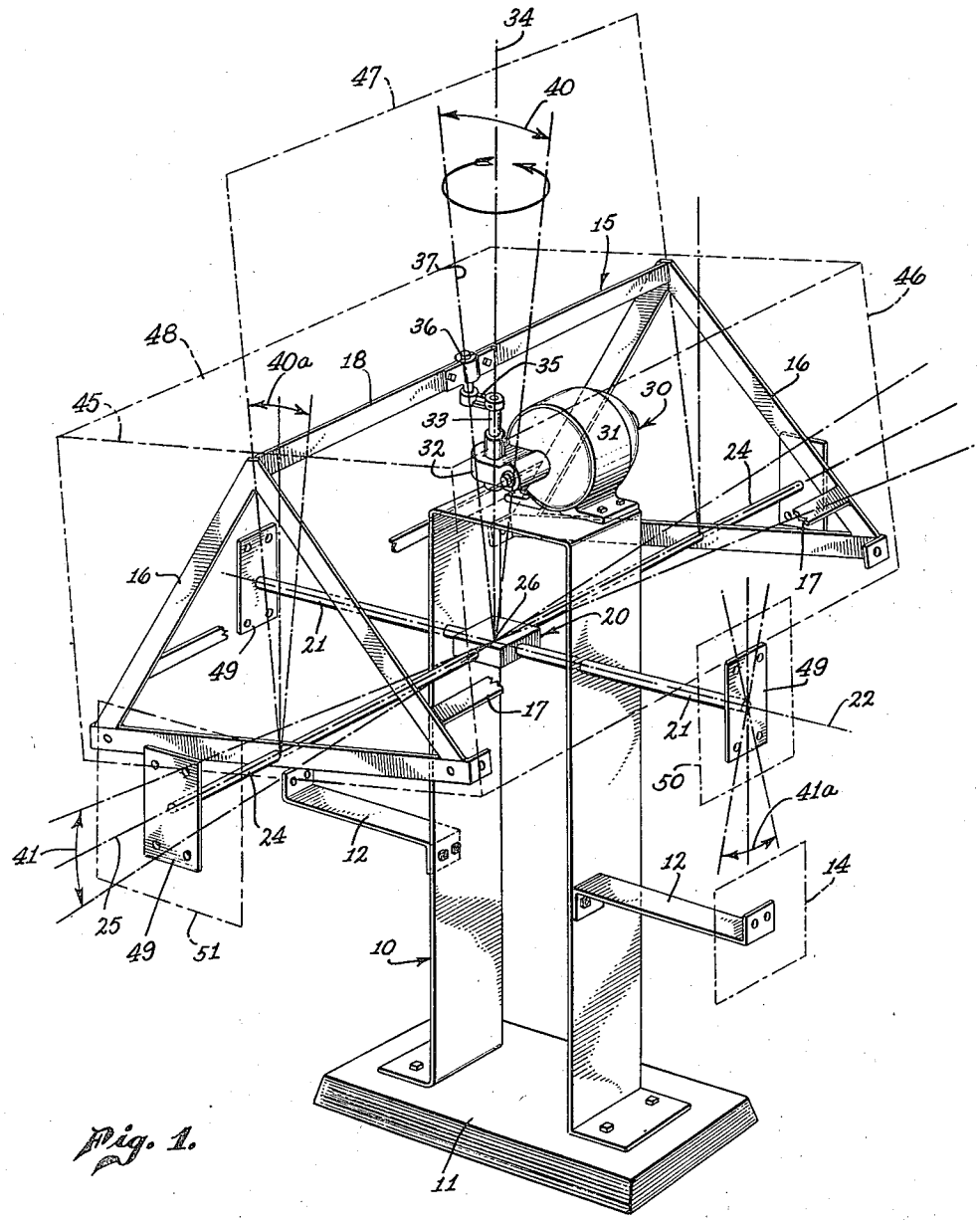


Fig. 1.

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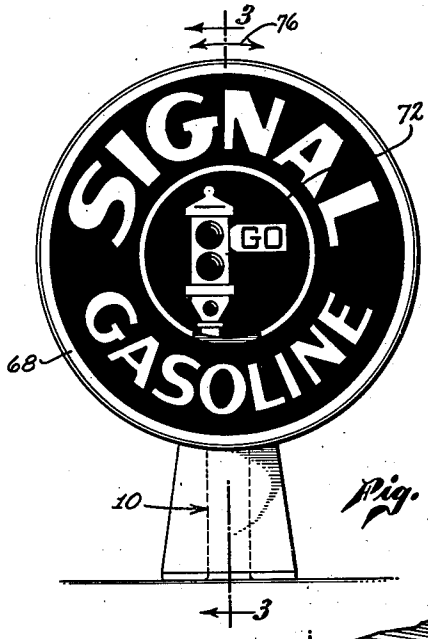


Fig. 2.

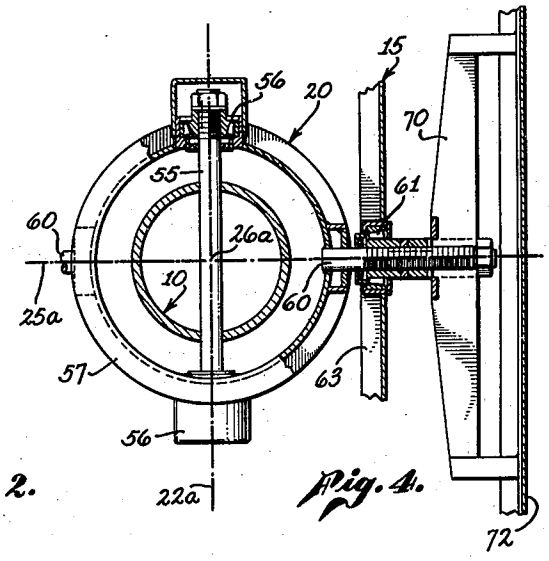


Fig. 4.

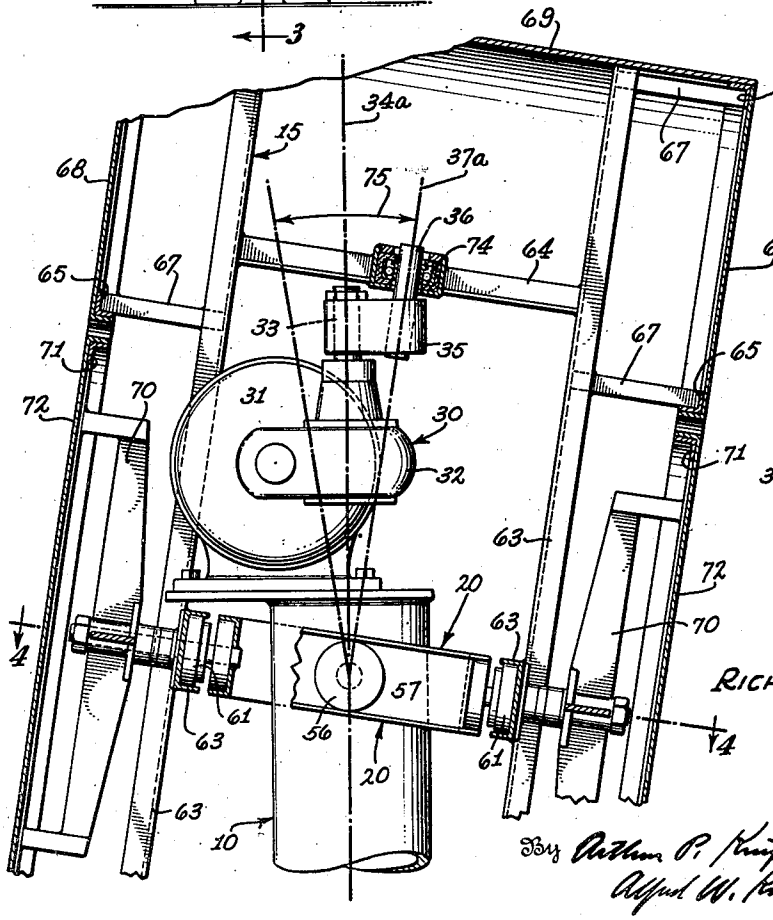


Fig. 3.

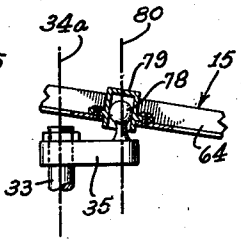


Fig. 5.

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ANIMATING MECHANISM FOR SIGNS

Richard U. Seares, Pasadena, Calif.

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7 Claims. (Cl. 40—139)

The present invention relates generally to displays or signs of the type used for advertising purposes, and more particularly to supporting and animating mechanisms therefor by which motion is imparted to one or more portions of the sign, signs of this type being referred to generally as "animated" because the movement of the various parts produces the appearance of animation of the sign.

One of the general objects of my invention is to provide a supporting and operating mechanism for signs which produces a pleasing and novel motion or motions of one or more portions of the sign, in order to impart to the advertising copy motion that arrests the attention and attracts the eye of members of the public.

It is another object of my invention to produce a supporting and animating mechanism for a sign which is adapted to produce a plurality of different resultant motions which may be utilized individually to impart motion to different portions of the same sign, and which have a common component and yet differ in part to produce relative motion between adjacent parts of the sign or display.

Another object is to provide a simplified supporting and animating structure for signs that is relatively inexpensive, rugged in construction, and simple to maintain.

These objects of my invention have been attained by providing a stationary supporting structure upon which is mounted a frame that is adapted to carry one or more signs located in various positions. Suitable mounting means, similar to a universal joint, are provided to mount the frame on the support in a manner that permits oscillation of the frame about two angularly disposed axes, preferably mutually perpendicular. Movement of the frame with respect to these axes is obtained by some suitable drive means, such as an electric motor, which is preferably adapted to drive a crank arm attached to the frame and moving the frame at the connection to the crank in a circle about a third axis substantially perpendicular to the first two axes.

How the above, as well as other objects and advantages of my invention are attained will be more easily understood by reference to the following description and the annexed drawings, in which:

Fig. 1 is a somewhat diagrammatic perspective elevation of a sign supporting and animating mechanism constructed according to my invention, the signs themselves being removed for simplicity of illustration, but possible locations of signs being indicated by dot-dash lines;

Fig. 2 is an elevation of a modified form of sign utilizing a part of the motions possible with the form shown in Fig. 1;

Fig. 3 is an enlarged vertical fragmentary section through the sign of Fig. 2 as on line 3—3;

Fig. 4 is a fragmentary horizontal section on line 4—4 of Fig. 3; and

Fig. 5 is a fragmentary section showing an alternative form of connection between the frame and drive means.

The drawings of Fig. 1 are intended to illustrate more or less diagrammatically the features of my invention, and consequently the various component parts of the sign supporting and animating mechanism are shown in simplified and typical forms which may be varied widely in construction and shape to accommodate the invention to any desired sign. For purposes of illustration, no signs have been shown mounted on the movable frame, but possible locations of such signs have been indicated.

The apparatus of Fig. 1 comprises a stationary support, indicated generally at 10, in the form of an inverted U-shaped member resting upon base 11. The exact shape of this stationary support is immaterial and it may comprise a plurality of members; or it may be a horizontally extending member in the event that it is desired to mount the sign-carrying frame on a vertical wall or the like. If desired, one or more brackets 12 may be attached to stationary support 10 for the purpose of carrying fixed or stationary signs, a typical one of which may be represented by the dot-dash rectangle 14.

There is indicated generally at 15 a frame of any suitable construction and design adapted to carry one or more signs. The frame shown, which is typical of suitable constructions, comprises a pair of triangular end members 16 connected together by longitudinal members 17 at the lower sides of the frame and longitudinal member 18 at the top.

Frame 15 is mounted upon support 10 by any suitable mounting means, preferably of the universal joint type, that permits the frame to oscillate about two angularly disposed axes with respect to the support. A simplified form of such frame mounting means is indicated generally at 20, and comprises a central block from which extends a pair of diametrically opposite bearing members 21 by means of which the mounting means 20 is pivotally or rotatably connected to

the vertical side members of support 10. The members 21 define a substantially horizontal axis 22 about which both mounting means 20 and frame 15 oscillate with respect to stationary support 10. This axis 22 is fixed because members 21 have only rotational movement with respect to stationary support 10; and axis 22 is normally horizontal, or substantially so, although it will be understood that the axis may be inclined or even vertical. Any desired type of bearing may be used to mount members 21 on support 10.

A second pair of bearing members 24 extends outwardly from the center block of mounting means 20 at right angles to axis 22 and provides means for pivotally connecting frame 15 to mounting means 20, the connection between the frame and members 24 being at any suitable location on the frame and of any suitable type that permits relative rotation of the frame with respect to the members 24. The pivotal connecting members 24 define a second axis 25 which moves as mounting means 20 rocks about axis 22 at the center, but axis 25 is, like axis 22, referred to for purposes of description as being substantially horizontal since it ordinarily occupies a horizontal position, or substantially one, at the center of its swing. Axes 22 and 25 are perpendicular to each other, or substantially so, and are coplanar to intersect one another at 26 in the preferred embodiment illustrated in Fig. 1.

However, it will be understood that it is not necessary that axes 22 and 25 be coplanar, since one may be vertically spaced from the other; nor is it necessary that they be mutually perpendicular, since they may be angularly disposed obliquely to each other. Either of these changes may be made without departing from the principles and fundamental motions of my invention, but may be utilized to change the motion produced at any point on frame 15.

The drive means indicated generally at 30 is typical of various suitable types of drive mechanism, and comprises motor 31 with a speed reduction assemblage 32 adapted to rotate vertically extending drive shaft 33 of which the vertical axis 34 is substantially perpendicular to both axes 22 and 25 and intersects both of these axes. When axes 22 and 25 intersect each other as at 26, then axis 34 passes through point 26 of intersection. The upper end of drive shaft 33 carries crank 35 and inclined crank pin 36 which is rotatably connected to longitudinal member 18 of frame 15 in any suitable fashion. The inclined axis 37 of crank pin 36 preferably passes through the common intersection 26 of axes 22, 25, and 34.

When in operation, drive shaft 33 rotates about its vertical axis 34 and moves crank pin 36 in a circular path around vertical axis 34. The axis of crank pin 36 being inclined as shown, axis 37 describes a cone of revolution about axis 34; and it is preferred that axis 37 be inclined with respect to axis 34 in order to eliminate binding in the journal bearing type of connection between pin 36 and member 18 of frame 15. If some other type of connection having self-aligning characteristics be used at this point, provision may be made for relative angular movement between the driving member and frame member 18, and as a consequence axis 37 may be vertical.

The circular motion of pin 36 moves the frame at its connection to the crank pin in a substantially circular path around axis 34, the frame having substantially no vertical movement at this point. The motion of the frame as a whole may be described as a gyratory motion about a center established by intersection 26. In greater detail, the resultant motion of the frame may be considered to be a compound motion whose components are motions of simultaneous oscillation about the two mutually perpendicular axes 22 and 25. The component of motion of crank pin 36 parallel to axis 22 causes frame 15 to rock or oscillate about axial members 24 and axis 25, as indicated by the arcs at 40 and 40*a*. The component of motion of pin 36 parallel to axis 25 causes frame 15, as well as the mounting means 20, to rock or oscillate about axial members 21 and axis 22, as indicated by the arcs at 41 and 41*a*.

As a consequence of this gyratory motion of frame 15, different types of compound motions may be imparted to signs mounted on the frame according to the location of the sign with respect to the frame. For example, if a sign is mounted on the end of the frame parallel to the plane of triangular frame member 16 in a position indicated by the dot-dash rectangle 45, the sign has a resultant motion produced by oscillation of the sign in a substantially vertical plane about axis 25 as indicated at 40*a* combined with a substantially vertical oscillating motion of the sign bodily about axis 22 as indicated at 41, the latter of which motions may be described as a nodding motion. If the sign is placed on frame 15 in a position parallel to longitudinal members 17 and 18 in the location indicated by dot-dash rectangle 46 the same general type of motion results because the same components are present. The exact motion of sign 46 will differ from that of sign 45 when there is any difference in the radial distances of the two signs from axes 22 and 25, or any difference in relative position of the signs with respect to the two axes.

While the same two components of oscillatory motion about axes 22 and 25 combine to produce a compound motion of a sign located above frame 15, as a vertical extension of member 18 indicated by dot-dash rectangle 47, yet to an observer at one side, the predominant motion is the oscillation of the sign about axis 22, since the oscillation about axis 25 simply moves the sign toward and away from an observer standing along the prolongation of axis 22. If the entire sign-supporting mechanism is rotated through 90 degrees, as previously suggested, so that stationary support 10 becomes horizontal, then a sign mounted on frame 15 in the position indicated by dot-dash rectangle 48 (the top horizontal surface of frame 15 as in Fig. 1) will appear to move in a circular path about axis 34 with the radius depending upon the distance the sign is removed from the intersection of axes 22 and 25.

Additional motions and combinations of motions may be obtained by extending axial members 21 and 24 of mounting means 20 out beyond frame 15 and providing these axially extending members wtih some means, such as brackets 49 upon which additional signs may be mounted. A sign thus mounted on member 21 in a position indicated by the dot-dash rectangle 50 rocks about axis 22 which is perpendicular to the plane of the sign, while a different motion is imparted to a sign mounted on the end of member 24 in a position indicated by dot-dash rectangle 51 since, although the motion is also about axis 22, the axis is now parallel to the general plane of the sign and the sign may be said to

nod. From this it will be seen that signs at 50 and 51 each have one component of the motion of signs at 46 and 45 respectively. This condition may be utilized, for example, by placing signs at both 45 and 51, preferably in substantially the same frontal plane, in which case both signs 45 and 51 move with a nodding motion, but in addition sign 45 rocks about axis 25, and the additional motion produces a relative movement between the two signs. A similar relative motion takes place between a sign at 50 and one at 46. The two signs are in each instance preferably in substantially a common frontal plane to obtain an improved appearance. This relative movement between two signs may be utilized to secure apparent animation of various portions of a figure or the like which composes a single display that moves as a whole.

From the foregoing it will be seen that there may be mounted upon the sign supporting and animating mechanism a plurality of signs in various locations to impart different motions to these signs, each of the signs oscillating about one or both of axes 22 and 25. In one aspect, those signs viewed at the same time may constitute independent signs from the standpoint of the advertising matter displayed thereon; or in another aspect, a plurality of signs, as at 45 and 51, may be placed in close proximity and combined so that from the standpoint of an observer they constitute separately movable parts of the same display. In either event, all the signs or parts of the display have one component of motion in common, while another sign or portion of the display has an additional component of motion, thus producing relative motion between individual signs or individual portions of the display taken as a whole. Since the size and shape of the signs and the character of the advertising matter displayed thereon may be varied infinitely and constitute no essential portion of the present invention, signs have not been illustrated in Fig. 1 disclosing the broad aspects of my invention, but typical locations have merely been indicated diagrammatically by the use of the dot-dash rectangles, although it will be understood that such indications of the signs in no way limit their shape or location.

There is illustrated in Figs. 2, 3, and 4 a modified form of my invention in which signs having the motions of the signs 45 and 51 of Fig. 1 are located in substantially a common frontal plane to form a single display, the two parts of which have relative movement with respect to each other. As shown in Fig. 3, the stationary support 10 in this modified form of my invention comprises an upright hollow pipe resting on any suitable base. Frame mounting means 20 includes horizontally extending shaft 55 passing entirely through the pipe of the support. The ends of shaft 55 carry suitable bearings 56, preferably of the ball or roller type, by means of which ring 57 surrounding stationary support 10 is rotatably mounted upon shaft 55. The frame mounting means also includes two diametrically opposite stub shafts 60 attached to ring 57 and provided at 61 with suitable bearings by means of which frame 15 is rotatably mounted upon the two shafts 60.

By means of this construction, frame 15 and its mounting means 20 are pivotally connected to support 10 to oscillate about the fixed substantially horizontal axis 22*a*; and frame 15 is pivotally connected to mounting means 20 to oscillate with respect thereto about the movable axis 25*a* which intersects axis 22*a* and is also substantially horizontal although it is adapted to swing through a limited arc. This universal joint type of mounting means permits frame 15 to oscillate simultaneously about both axes 22*a* and 25*a*.

The construction details of frame 15 are of no particular importance, since they may be varied. The frame shown in the drawings comprises two pairs of channels 63 joined together at right angles, the frame being mounted by bearings 61 located at this junction of two channels 63. The two pairs of channels 63 are joined together by braces 64 between the outstanding legs of channels 63, braces 64 serving also to hold the pairs of channels properly spaced from each other. A pair of angle members 65 and 66 bent into concentric circles are mounted at each side of the frame by braces 67. Each two angles 65 and 66 support an annular sign 68, as shown particularly in Fig. 2, there being one sign 68 on each side of the frame. A cover member 69 around the outside of the frame is attached to angle 66 to protect the sign interior against the entrance of dirt and moisture, it being understood that cover 69 is cut away at the bottom to permit necessary motion of the frame with respect to stationary support 10.

Each of the two axially extending stub shafts 60 is extended outwardly beyond frame 15 and bearings 61, as shown in Figs. 3 and 4, and carry on this extension a sub-frame, indicated at 70, which may be of any suitable construction. Sub-frame 70 includes a circular angle member 71, concentric with angle member 65, and spaced radially inward therefrom. A circular sign 72 is mounted, as shown in Fig. 3, on the outside face of sub-frame 70 by attachment to ring 71. Signs 68 and 72 on the same side of frame 15 are located substantially in a common frontal plane and constitute together a single display or sign since they carry related advertising matter. A similar display is formed on each of two sides, one side being shown in Fig. 2, although the advertising matter on the two sides may be the same or different.

The drive means 30 is substantially the same as already described, and comprises a motor 31 with a speed reduction head 32 driving a vertical shaft 33 whose axis 34*a* is substantially perpendicular to both of axes 22*a* and 25*a* and passes through the intersection 26*a* of these axes. Crank 35 is attached to drive shaft 33 and carries inclined crank pin 36 having an axis 37*a* which also preferably passes through point 26*a*. Crank pin 36 is connected to frame 15 by a suitable self-aligning bearing structure 74 on one of braces 64, it being preferred that pin 36 be capable of limited axial movement with respect to the bearing 74.

By analogy with the form of invention disclosed in Fig. 1, it will be seen that the motion of signs 68 and 72 produced by rotation of shaft 33 and crank 35 is the same as the combined nodding and oscillating motion of signs 45 and 51. The entire display formed by signs 68 and 72 oscillates about the fixed horizontal axis 22*a* through the arc indicated at 75. In addition to this motion, the outer annular sign 68 oscillates on shaft 60 about axis 25*a* through an arc as indicated in Fig. 2 by arrow 76. The sign 68 moves with respect to the inner sign 72 by the amount of this additional component of motion represented by arc 76.

Fig. 5 illustrates a modified form of connection between frame 15 and crank 35 of the drive

means 30. In this form, the cylindrical crank pin 35 is replaced with a post having a ball 78 on its upper end that is received in a cylindrical socket 79 on brace 64. This type of ball-and-socket connection allows not only angular movement of brace 64 with respect to arm 35, but also vertical movement. Because of these fully self-aligning characteristics, the axis 80 of post 78 may be vertical or parallel to axis 34a. Although shown as applied to the embodiment of Figs. 2–4, this modification can also be applied to the embodiment of Fig. 1.

From the foregoing description of certain typical embodiments of my invention, it will be understood that the construction and arrangement of parts may be the subject of many changes without departing from the spirit and scope of my invention; and consequently it is to be understood that the drawings and description are to be considered as illustrative of, rather than restrictive upon, the claims appended hereto.

I claim:

1. A supporting and animating mechanism for signs comprising a stationary support; a frame adapted to carry one or more signs; mounting means for mounting the frame on the support for oscillation of the frame about two angularly disposed axes; and drive means for moving the frame including a crank and a pin on said crank revolving about a stationary axis substantially perpendicular to both said axes of oscillation of the frame.

2. A supporting and animating mechanism for signs comprising a stationary support; a frame adapted to carry one or more signs; mounting means for mounting the frame on the support for oscillation of the frame about two intersecting and mutually perpendicular axes; and drive means for moving the frame including a crank and a crank pin revolving about an axis substantially intersecting and perpendicular to both said axes of oscillation of the frame, the axis of the crank pin being inclined to and intersecting said axis of its revolution.

3. A supporting and animating mechanism for signs comprising a stationary support; a frame adapted to carry one or more signs; mounting means for mounting the frame on the support and comprising means pivotally connecting the mounting means to the support to oscillate about a first axis and means pivotally connecting the frame to the mounting means to oscillate about a second axis substantially perpendicular to the first axis; and drive means for moving the frame comprising a crank revolving around a stationary axis, a crank pin moving in a circular path with the pin axis constantly inclined to said axis of revolution, and a bearing rotatably connecting the crank pin to the frame and maintaining the pin and frame in a fixed angular relation to each other.

4. A display structure comprising a statonary support; a frame adapted to carry one or more signs; mounting means for mounting the frame on the support for oscillation of the frame about two perpendicular, generally horizontal axes; drive means for moving the frame; and a plurality of signs mounted on the frame in different positions with respect to the axes, each sign oscillating about both of said axes but with a different motion.

5. A display structure comprising a stationary support; a frame adapted to carry one or more signs; mounting means for mounting the frame on the support for oscillation of the frame about two perpendicular, generally horizontal axes, said mounting means including an axially extending member adapted to carry a sign; drive means for moving the frame; and signs mounted one on the frame and one on said axially extending member, each of said signs having a different resultant oscillatory motion with respect to said horizontal axes.

6. A display structure comprising a stationary support; a frame adapted to carry one or more signs; mounting means for mounting the frame on the support for oscillation of the frame about two perpendicular, generally horizontal axes said mounting means including an axially extending member adapted to carry a sign; drive means for moving the frame; a sign mounted on the frame in a position for oscillation about both said axes; and a second sign mounted on said axially extending member in a position to oscillate about only one of said axes.

7. A display structure comprising a stationary support; a frame adapted to carry one or more signs; mounting means for mounting the frame on the support for oscillation of the frame about two perpendicular, generally horizontal axes said mounting means including an axially extending member adapted to carry a sign; drive means for moving the frame; a sign mounted on the frame in a position for oscillation about both said axes; and a second sign mounted on said axially extending member in a position to oscillate about only one of said axes extending substantially parallel to the plane of the second sign, both said signs lying substantially in a common frontal plane.

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