

[54] **POSTER DISPLAY DEVICE**

328,624 3/1958 Switzerland.....40/145 A

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[51] Int. Cl.....**G09f 7/22**

[58] Field of Search.....**40/125 H, 145 A**

[57] **ABSTRACT**

The poster display device includes a base upon which is mounted a poster frame for receiving posters and like advertising media. The means for mounting the poster frame onto the base comprise a spring structure interconnecting the lower portion of the poster frame to the base at at least two points. The poster frame normally extends vertically upwardly from the base. The surface area of the frame is relatively large. The spring structure upon which the frame is mounted permits the frame to deflect downwardly upon the application of a force thereto, as for example, the wind when the structure is located out-of-doors. The frame may deflect in either direction without danger of tipping the base. The stronger the applied force, the more the frame will deflect downwardly thus reducing the component of any force tending to topple the display device. Further, the frame size, center of gravity and base size are so dimensioned as to prevent tipping as a result of gravity leverage after the frame has been deflected by the wind.

[56] **References Cited**

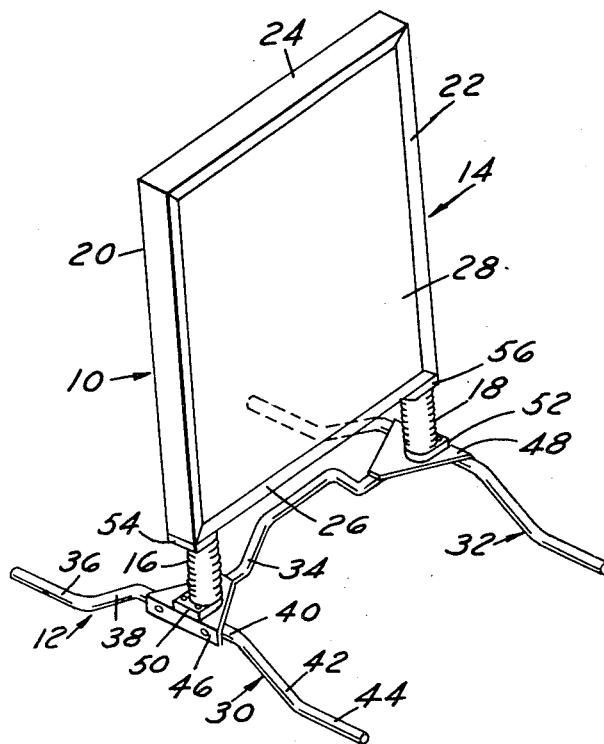
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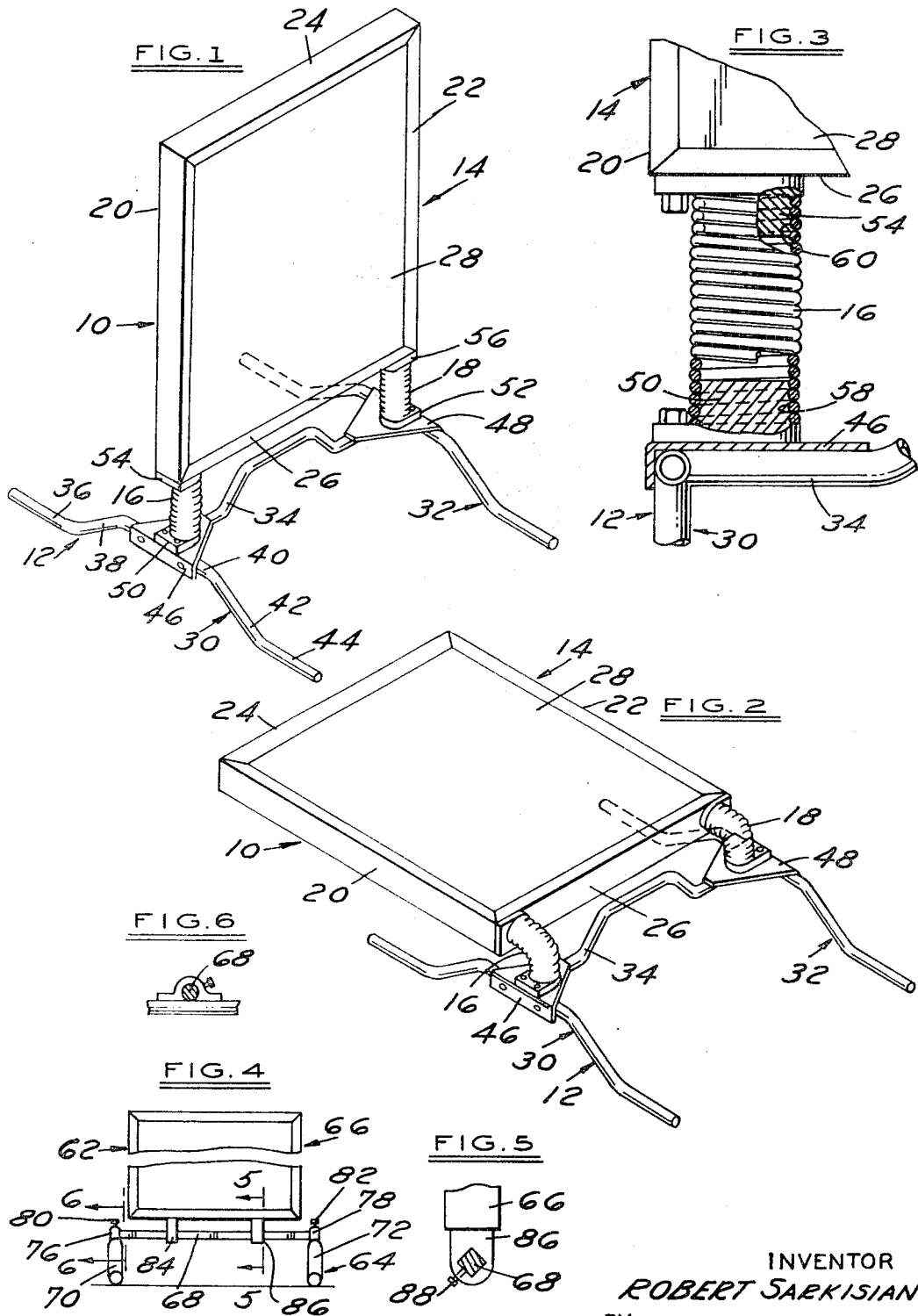
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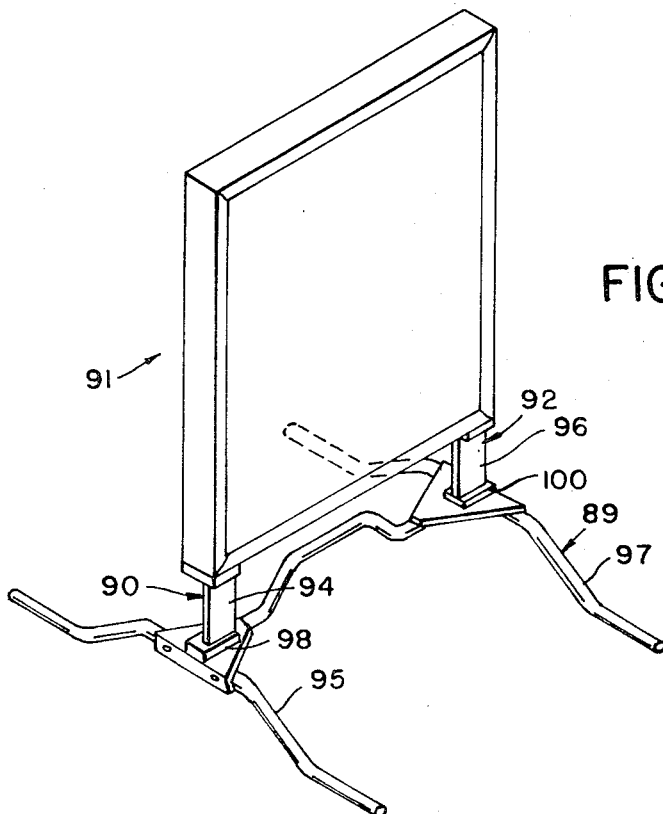
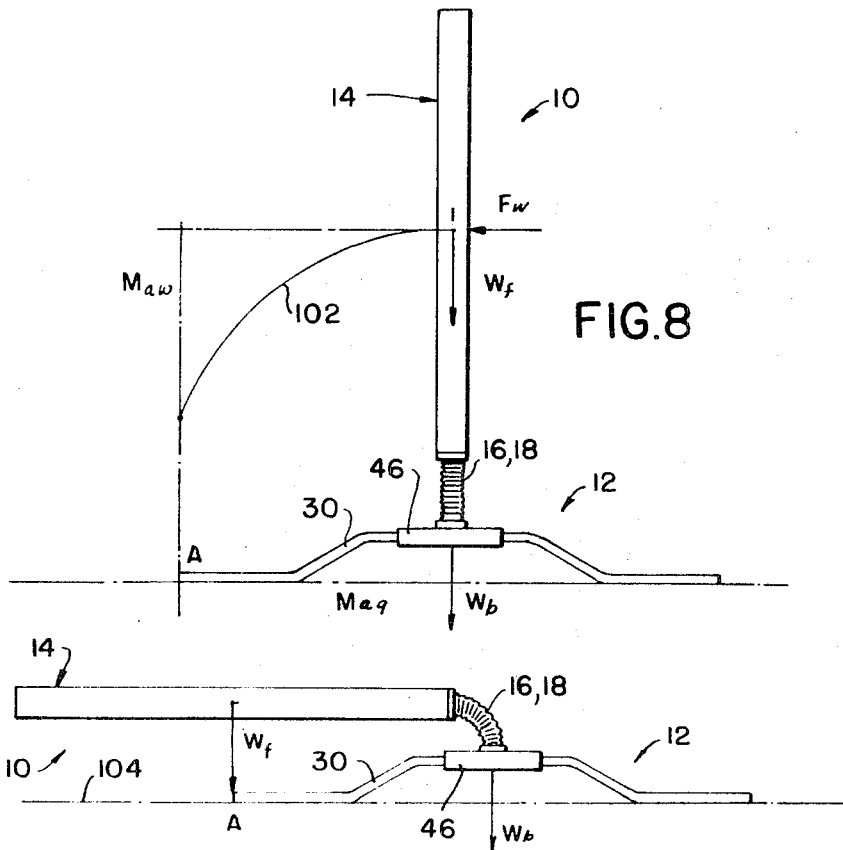
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3 Claims, 9 Drawing Figures





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POSTER DISPLAY DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of my copending application, Ser. No. 670,511, filed Sept. 11, 1967.

BACKGROUND OF THE INVENTION

Poster display devices of the general type to which the present invention relates have long been in wide spread use. The display devices are normally used out-of-doors to advertise services or products, for example, in front of theatres and gas stations. One of the problems which has been encountered in the past with such poster display devices is that they are frequently tipped over by the wind.

Conventionally, such display devices have comprised a base having an upstanding rectangular hanger structure extending upwardly therefrom. The frame for the advertising poster has been pivotally mounted to the top of the hanger structure. The poster frame has thus been free to swing in a manner similar to a pendulum under the force of a wind. When the wind dies down, the poster frame settles in a central position as a result of gravity. Such devices, in practice, will topple under the force of a strong wind.

The present invention overcomes this problem by providing a poster frame which is mounted to a base by a spring structure which permits the poster frame to be deflected downwardly rather than upwardly whereby the component of the wind force tending to tip the device is diminished as the wind velocity increases. Also, the dimensions and location of centers of gravity of the sign components are so dimensioned as to prevent tipping of the sign after deflection of the frame by the wind.

SUMMARY OF THE INVENTION

The display device includes a base upon which an upstanding poster frame is mounted by means of a spring structure. The spring structure is connected to the lower portion of the frame at at least a pair of locations. The spring structure normally maintains the frame in an upright position. The spring structure is yieldable to permit downward deflection of the frame in either direction along an axis generally parallel to the frame structure.

IN THE DRAWINGS

FIG. 1 is a perspective view of a poster display device in accordance with one embodiment of the present invention;

FIG. 2 is a perspective view of the poster display device in FIG. 1 illustrating the poster frame structure in a deflected position;

FIG. 3 is a view on an enlarged scale of the spring structure which connects the poster frame to the base with portions broken away for the purpose of clarity;

FIG. 4 is a front elevational view of another embodiment of the invention;

FIG. 5 is a sectional view taken substantially along the line 5—5 of FIG. 4 looking in the direction of the arrows;

FIG. 6 is a sectional view taken substantially along the line 6—6 of FIG. 4 looking in the direction of the arrows;

FIG. 7 is a view in perspective of another embodiment of the invention;

FIG. 8 is a side elevational view of the sign illustrating the forces applied prior to frame deflection;

FIG. 9 is a side elevational view of the sign illustrating the forces applied subsequent to frame deflection.

Referring first to the embodiment illustrated in FIGS. 1-3, it will be noted that the poster display device 10 comprises a base structure 12 having a frame structure 14 mounted thereon by means of springs 16, 18.

The frame structure 14 is rectangular in shape and has side members 20, 22, top member 24 and bottom member 26. A rigid backboard or panel 28 is mounted within the frame. The backing member 28 may be fabricated of, for example, a

material such as masonite or a metallic sheet material such as aluminum. It will be appreciated that the backing member 28 presents a relatively large surface area which, when subjected to the force of a strong wind, would normally tend to tip the entire device over.

The backing member 28 is adapted to have mounted thereon an advertising poster or the like. Such a poster may be mounted on either or both sides of the backing member. The means for mounting the poster may be an adhesive or like means conventionally used for mounting of posters. One preferred poster holding mechanism is illustrated in my U.S. Pat. No. 3,310,901, issued Mar. 28, 1967. In that patent, the frame members are constructed in two parts with the inner portions being hingedly fastened to the outer portions to permit opening thereof for the reception of a poster. Spring means are provided to bias the inner portions into contact with the backing member so that when the inner portions are closed, they will remain in position and clampingly engage the poster.

The base structure 12 comprises a pair of elongated spaced apart generally parallel tubular members 30, 32 which are interconnected by a tubular cross member 34 which extends therebetween.

Referring representatively to the tubular member 30, each tubular member comprises a first horizontally disposed portion 36 which serves as one ground-engaging foot, a second upwardly inclined portion 38, a third horizontally extending portion 40, a fourth downwardly inclined portion 42 and a fifth horizontally directed portion 44 which serves as a second ground-engaging foot. It should be noted that each of the tubular members 30, 32 extends at substantially right angles to the plane of the backing member 28. Thus, any force directed against the backing member will tend to tip the display device about one pair of the spaced apart feet of the tubular members 30, 32.

A V-shaped mounting plate 46, 48 is secured to the base at each juncture of the cross member 34. A spring mounting member 50, 52 is secured on each plate 46, 48. A similar spring mounting member 54, 56 is secured to the undersurface of the bottom frame member 26 adjacent each end thereof. As will be noted in FIG. 3, the spring mounting members are oppositely disposed. Each of these members has an externally threaded cylindrical portion 58, 60 extending therefrom. The springs 16, 18 which are coil springs, are threaded onto the threaded portions 58, 60 to thereby secure the frame structure 14 to the base structure 12.

Operation of the poster display device may now be understood. Referring first to FIG. 1, it will be noted that the frame structure 14 normally is biased to an upright position by the springs 16, 18. Upon the application of a force against the backing member 28, the frame structure will deflect downwardly as shown in FIG. 2. The greater the force applied, the further the deflection. FIG. 2 illustrates an almost completely deflected frame. In the position illustrated in FIG. 2, the effective force against the display device tending to tip the device is negligible. It will be appreciated that as the frame structure is deflected downwardly, the effective wind force is reduced much in the manner of a sail on a boat coming into the wind.

The springs 16, 18 are wound with the coils thereof in compression, that is, the coils press against one another. An optimum intercoil pressure is then chosen for each different sized display device. The springs are wound with the maximum possible intercoil pressure because this permits reduction in the diameter of the spring wire and thus reduces the cost of the spring. However, the coils cannot be overly tight else the spring will not deflect at the proper pressure (which is just below that which would cause tipping of the device). Additional advantages of this spring construction are that it holds the poster frame erect under mild wind pressures thus avoiding constant swinging motion of the top portion of the frame, and the spring, for a given wire type and size, is stronger thus raising the frame faster from the down position after the wind force diminishes.

FIGS. 4, 5 and 6 illustrate an alternate embodiment of the invention. The poster display device 62 is in many respects similar to the poster display device 10. The base structure 64 and frame structure 66 are substantially identical to those previously described. However, the spring structure has been modified.

A torsion spring 68 extends between and interconnects the spaced apart tubular base members 70, 72. The torsion spring 68 has a square cross section as shown in FIG. 5. The ends of the torsion spring are cylindrical as illustrated in FIG. 6. A bracket 76, 78 is provided on each of the tubular members 70, 72 to receive the ends of the torsion spring. Each bracket has a set screw 80, 82 to engage the ends of the spring. The set screws permit angular adjustment of the spring 68 to the end that the frame structure 66 may be oriented in a vertical plane.

A pair of brackets 84, 86 extend from the underside of the frame structure 66. The brackets 84, 86 have square openings to receive the torsion spring. A set screw 88 is provided to engage the torsion spring and prevent longitudinal movement of the frame structure therealong. As will be appreciated, the spring 68 will yield under a turning force and twist about the anchored ends thereof to permit deflection of the frame structure in the manner illustrated in FIG. 2.

FIG. 7 illustrates a further embodiment of the invention which, excepting for the spring support structure, is the same as that illustrated in FIGS. 4-6, including a base structure 89 and frame structure 91 which are the same as previously described. As will be noted, a pair of flat metallic springs 90, 92 extend from the bottom of the frame structure 91 into connection with the brackets 98, 100. The springs 90, 92 are wider than they are thick. The large flat surfaces 94, 96 face in the direction of the longitudinal axis of the legs 95, 97 with the result that when the frame structure is caused to deflect as the result of a wind force, the horizontal component of the path of deflection will be along the longitudinal axis of the legs 95, 97 as was the case in connection with the FIG. 1 embodiment. The springs 90, 92 are, again, selected with a spring force so that they will give and permit deflection of the frame structure before the entire unit topples.

FIGS. 8 and 9 illustrate the forces and moment arms of the poster display device 10 which would tend to tip the device about the base as a result of a wind force being applied thereto and as a result of gravity. The various notations are explained in connection with the Figures. The display device 10 is illustrated. However, the statics described in connection therewith apply equally to the display devices forming the embodiments of FIGS. 4 and 7.

Referring to FIG. 8, the force of the wind is assumed to be concentrated at the geometric center of the face of the sign frame 14 against which the wind is directed. The weight of the sign frame 14 is nominally assumed to be concentrated at the center of gravity of the sign frame which, for the purposes of this analysis, is assumed to coincide with the geometric center of the sign frame 14. In actuality, the center of gravity under consideration would be somewhat lower because the springs and bracket structures attaching them to the bottom of the sign frame move with the sign frame when it is deflected and therefore constitute a portion of the mass of the sign frame structure.

As will be noted in FIG. 8, initially the wind force, F_w , acts through a moment arm, M_{wk} , about the point A tending to tip the sign in the counter-clockwise direction. This tipping force is opposed by the weight of the sign frame, W_f , and the weight of the base, W_b , acting through a moment arm M_{wb} . Initially, M_{wb} is the same for both W_f and W_b .

In designing the device, one feature of fabrication is that the springs 16, 18 are selected so that before the sign device will tip, the springs will flex resulting in downward deflection of the sign frame structure 14. Therefore, the condition for tipping of the sign initially, namely that F_w times M_{wk} is greater than $(W_f + W_b)$ times M_{wb} cannot exist because the spring will flex before this occurs.

As the sign frame deflects, the center of gravity will follow a path along the arc 102. The center of gravity of the sign frame

and also the point of application of F_w fall along this arc. As will be appreciated, the moment arm, M_{wk} , through which force F_w acts constantly becomes shorter. Additionally, F_w decreases because the effective area of the sign frame with respect to the wind force decreases as the sign frame is tilted. Thus, the possibility of the entire device tipping as the result of the wind force actually diminishes as the sign frame is deflected.

The moment arm of the weight of the sign frame structure, W_f , also becomes shorter as the sign frame is tipped. However, the moment arm of the weight of the base, W_b , remains constant.

A point of possible instability occurs when the center of gravity of the sign frame structure reaches a point in direct alignment with the tipping point A as illustrated in FIG. 9. At this point, W_f passes directly through the moment arm which could cause tipping and therefore exerts no force to either tip or prevent tipping of the unit. If the distance of the center of gravity of the sign frame structure from the ground level 104 is greater than the distance from the center of the base to the point A, further tipping of the sign frame structure will cause the center of gravity thereof to pass beyond point A to thus exert a force through its moment arm tending to tip the device. The force of the wind is, at this point, almost zero because the effective area of the sign face approaches zero with respect to the wind as the sign frame becomes parallel with the wind force.

The sign will tip, at this time, if W_f times its moment arm about the point A is greater than W_b times its moment arm M_{wb} about the point A. In practice, the weight and size of the sign frame structure 14, including the weight of the springs 16, 18 and the attaching plates therefor, is considerably greater than the weight of the base 12. It is desired to maintain the weight of the base 12 at a minimum from the standpoint of portability of the device and from the standpoint of manufacturing economy. Therefore, the center of gravity of the sign frame structure is designed at a distance from the ground level 104 which is substantially equal to half the length of the base whereby the center of gravity, when the sign frame is completely tipped, as in FIG. 9, will be in substantial alignment with the point A thus preventing tipping as a result of gravity.

Thus, the variables to be controlled are W_f and the distance of the center of gravity thereof from the ground level and the W_b and the length of the base. In practice, the simplest means of designing the display device is to vary the length of the base as needed in order to prevent tipping. The display device is designed in accordance with the following formula:

$$W_f (D_g - D_b) < W_b D_b$$

Where:

W_f is the weight of the sign frame structure including the support springs and attached brackets.

W_b is the weight of the base.

D_g is the distance from the center of gravity of the sign frame structure to the ground level.

D_b is one-half the length of the base.

D_b is preferably substantially equal to D_g .

What I claim as my invention is:

1. A display device comprising an unanchored base, said base including a pair of spaced apart elongated ground-engaging means, an upstanding frame structure having a relatively large surface area for receiving display indicia, a spring structure mounting the frame structure onto the base, said spring structure comprising spring means connected at two spaced apart locations between the lower portion of the frame structure and the base, said spring structure being mounted centrally of the ground-engaging means with the plane of the frame structure at substantially right-angles to the longitudinal axis of said ground-engaging means, the surface area of the frame being of a size which normally causes displacement of the base upon application of a sufficient wind force thereagainst, said spring structure normally maintaining the frame structure in an upright position and being yieldable in

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either direction along an axis generally parallel to the plane of the frame structure in the direction of the longitudinal axis of the ground-engaging means, the resistance to deflection of said spring structure being such that the spring structure will deflect upon application of a force thereto less than that necessary to tip the display device and permit downward deflection of the frame structure, and where the display device is designed in accordance with the following formula:

$W_f(D_o - D_b) < W_b D_b$

Where:

W_f is the weight of the frame structure including the spring structure.

W_b is the weight of the base.

D_o is the distance from the center of gravity of the sign frame structure to the bottom of the base.

D_b is one-half the length of the base.

2. A display device comprising an unanchored base, said base including elongated ground-engaging means, an upstanding frame structure having a relatively large surface area for receiving display indicia, a spring structure mounting the frame structure onto the base, said spring structure comprising spring means connected at least at two spaced apart loca-

tions between the lower portion of the frame structure and the base, the said spring structure normally maintaining the frame structure in an upright position and being yieldable in either direction along an axis generally parallel to the plane of the frame structure to permit downward deflection thereof, and where the display device is designed in accordance with the following formula:

$W_f(D_o - D_b) < W_b D_b$

Where:

W_f is the weight of the frame structure including the spring structure.

W_b is the weight of the base.

D_o is the distance from the center of gravity of the sign frame structure to the bottom of the base.

D_b is one-half the length of the base.

D_b is substantially equal to D_o .

3. The display device in accordance with claim 2 and further characterized in that said spring structure comprises a pair of spaced apart flat springs extending upwardly from the base, said frame structure being secured to the upper ends of the springs.

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Disclaimer

3,662,482.—*Robert Sarkisian*, Oak Park, Mich. POSTER DISPLAY DEVICE. Patent dated May 16, 1972. Disclaimer filed June 1, 1972, by the inventor.

Hereby disclaims the portion of the term of the patent subsequent to Mar. 7, 1989.

[*Official Gazette December 26, 1972.*]