SELF-RIGHTING ROAD DELINEATOR

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Primary Examiner—Louis J. Capozzi
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ABSTRACT

A road delineator or marker comprises a vertically disposed delineating member, such as a post or cone, attached to a horizontally disposed elastomeric base. The delineator is constructed to have a very low center of gravity and to permit a substantial portion of the base to remain in contact with the ground to constantly maintain the delineator's pivot axis and center of gravity substantially within the confines of the base. In addition to such positioning of the delineator's pivot axis and center of gravity, means for automatically self-righting the delineator comprises a suitably composed and constructed base which exhibits predetermined degrees of elasticity and flexibility.

18 Claims, 11 Drawing Figures
3.705566 1. SELF-RIGHTING ROAD DELINEATOR

BACKGROUND OF THE INVENTION

Road markers, delineators and like devices normally comprise an upstanding cone or post attached to a semi-rigid base. When such devices are struck by an automobile, for example, they normally pivot about an outer edge thereof. Due to their inherent construction, such devices do not exhibit a self-righting capability and thus require manual effort to restore them to their functional, upright position when they tip over.

SUMMARY AND OBJECTS OF THIS INVENTION

An object of this invention is to overcome the above, briefly described by providing a non-complex and economical delineator which is inherently capable of self-righting itself when tipped over. Such device comprises a vertically disposed delineating member having a flexible and elastomeric base attached thereto. The base is constructed to constantly maintain a substantial portion of the base in contact with the ground and the delineator's pivot axis and center of gravity substantially within the confines of the base.

In the first hereinafter described delineator embodiment, the self-righting moment is primarily induced due to the high degree of "elastic memory" or spring-back exhibited by the base. The base for a second embodiment has less elasticity and more flexibility to essentially combine the two characteristics for self-righting purposes. A third delineator embodiment primarily induces the self-righting moment due to the high degree of flexibility designed into the base by way of material composition and/or by mechanical features. In particular, such flexibility aids in properly locating the delineator's shifting center of gravity "under center" relative to the base's pivot axis during a tipping and self-righting cycle. As will be further described, the above flexibility and elasticity characteristics may be suitably varied to induce a self-righting moment to satisfy any particular delineator application.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects of this invention will become apparent from the following description and accompanying drawings wherein:

FIG. 1 is a partially sectioned, side elevational view of a first delineator embodiment of this invention;

FIGS. 2 and 3 are rear elevational and top plan views, respectively, of the FIG. 1 delineator;

FIG. 4 schematically illustrates the FIGS. 1-3 delineator as it would appear during a tipping and automatic self-righting cycle;

FIG. 5 is a partially sectioned, side elevational view of a second delineator embodiment;

FIGS. 6 and 7 are top and bottom plan views, respectively, of the FIG. 5 delineator;

FIG. 8 is a view similar to FIG. 4, but schematically illustrating the FIGS. 5-7 delineator during a tipping and automatic self-righting cycle;

FIG. 9 is a partially sectioned, side elevational view of a third delineator embodiment;

FIG. 10 is a top plan view of the FIG. 9 delineator; and

FIG. 11 is a view similar to FIG. 8, but schematically illustrating the FIGS. 9 and 10 delineator during a tipping and automatic self-righting cycle.

2 DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1-3 illustrate a first delineator embodiment comprising an upstanding delineating member or cylindrical post having a base attached thereto. The hollow post, the thickness of which has been substantially enlarged (approximately five times) for illustration purposes, may comprise a lightweight and semi-rigid plastic material such as ethylene vinyl acetate. A light reflecting strip or reflector may be adhesively or otherwise suitably secured to the post to be readily detected when light is shone thereon.

In addition, identical pairs of conventional reflectors may be suitably attached to a reduced neck portion of the post by means of conventional fasteners. If so desired, one or two reflectors may be attached to only one side of the post for delineating purposes. In addition, the post material is preferably translucent and may be colored light orange or the like to further enhance the delineator desiderata.

Horizontal base may comprise a rectangular configuration bordered by an upstanding ridge. An annular collar portional of the base defines a circular opening which receives cylindrical portion of the post therein. The post may have a horizontally disposed flange integrally formed as a molded part thereof, frictionally engaging the bottom of the base for retention purposes. If so desired, the flange may be adhesively or otherwise suitably secured to the base.

Referring to FIG. 4, the physical and chemical properties of the base are such that it is afforded the desired elasticity and flexibility to permit the post to be tilted clockwise to its extreme horizontal position and to automatically self-right itself to its full line vertically disposed position. In one specific application, the elastomeric base exhibited the following physical and chemical characteristics and properties:

**PHYSICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Weighted Base Material</th>
<th>45</th>
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<tr>
<td>Durometer (Shore A)</td>
<td>45</td>
</tr>
<tr>
<td>Tensile at 100% elong.</td>
<td>1000 lbs./in²</td>
</tr>
<tr>
<td>200% elong.</td>
<td>1400 lbs./in²</td>
</tr>
<tr>
<td>Tensile Ultimate</td>
<td>1500 lbs./in²</td>
</tr>
<tr>
<td>Elongation Ultimate</td>
<td>225%</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>2 (117.2lbs./gal.) (128.7lbs./ft³)</td>
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**CHEMICAL CONTENT (By weight)**

| P.V.C. Resin (Polyvinylchloride) | 11% |
| Plastidict (Primary)            | 22% |
| High Density Filler (Lead Powder) | 36% |
| Stabilizer (Heat)               | 4% |
| Pigment                        | 6% |

The delineator comprised the following dimensions:

| Total Height | 40.0 in |
| Size of Base 22 | 18.0 in. x 12.0 in. x 1.5 in. |
| Height of Flange 28 | 0.75 in. |
| Thickness of Flange 28 | 0.875 in. |
| Dia. of Post 21 | 4.0 in. |
| Wall Thickness of Post 21 | (Approx.) 0.1 in. |

It should be understood that the above is by way of example only and that the base's physical and chemical properties may be suitably varied to comply with a particular delineator application. In particular, the automatic self-righting moment of the above example of the FIGS. 1-3 delineator embodiment is primarily induced by the "elastic memory" or resiliency of the base.
As illustrated in FIG. 4, a conventional road marker (not shown) will normally tend to pivot about an external pivot point or axis P.P. when subjected to an external force F. In contrast thereto, the delineating device of this invention will exhibit a low center of gravity C.G. which will tend to pivot about a pivot or axis C.G.P. approximately through positions C.G.' and C.G." when the tipped mass of the delineator is pivoted through positions 20' and 20".

It should be noted that a substantial, horizontal portion of the base, positioned to the right of C.G.P., will constantly remain in contact with the ground. The base's "memory" induces the self-righting moment even though C.G." is moved to an over-center position relative to C.G.P. In particular, since the shifting center of gravity C.G. of the deflected mass and pivot axis C.G.P. are constantly maintained substantially within the confines of the base and further due to the inherent "elastic memory" of the base, the delineator will "spring back" to automatically self-right itself from the horizontal position 20" back to its normal position 20.

The degree of induced "spring-back" increases in direct proportion to the degree of clockwise pivoting of the delineator and need only return C.G. to an under center position relative to C.G.P. The influence of gravity thereafter returns the delineator to position 20.

Such spring-back is primarily occasioned at upper portions of the base and flange 28, positioned closely adjacent to pivot axis C.G.P. In actual practice, bent upper portions of the base and flange (FIG. 3) are placed in pronounced compression whereas the oppositely disposed or lower base portions are inversely placed in tension to induce the self-righting moment. The bent flange portions, in particular, will be subjected to considerable tension/compression and will actually bulge outwardly to aid in such self-righting function.

FIGS. 5-7 illustrate a second delineator embodiment 20a, shown in the form of a road marker, which functions similar to the FIGS. 1-4 delineator but combines the base's flexibility and resiliency to induce the self-righting moment. In particular, the base is designed to exhibit somewhat greater flexibility and lesser resiliency than the FIGS. 1-4 base. Such road marker comprises an upstanding and conically shaped delineating member 21a and base 22a which may be composed of substantially the same material as that used for the post and base of the first described embodiment.

In this embodiment, a downwardly extending flange 28a is formed discontinuously about the octagonally shaped base with each flange portion being chamfered at each end thereof (FIG. 7). An annular flange 29a extends downwardly to engage a radially outwardly extending flange 30a of cone 21a. As in the above described embodiment, flange 30a may be adhesively or otherwise suitably secured to flange 29a although normally a press-fit relationship therebetween has proved sufficient for retention purposes.

Referring to FIG. 8, when the delineator is tipped over its normal, vertical position 20a to its fully down or horizontal position 20", by an external deflecting force F, it will self-right itself automatically. When the cone is at intermediate position 20", the center of gravity C.G. of the cone assembly is pivoting in an arc about pivot axis C.G.P. rather than pivot point P.P. which, as above suggested, is the normal pivot point or axis for conventional road markers. In such intermediate second position, the center of gravity C.G." of the tipped mass is still maintained to the left of pivot axis C.G.P.

Therefore, at this intermediate position the delineator will automatically return to its original, upright position 20a upon removal of deflecting force F primarily due to the influence of gravity. When the delineator is deflected to its fully down position 20", it should be noted that the shifted center of gravity C.G." is positioned only slightly over center (compared to FIG. 4) relative to C.G.P. Such positioning of a substantial portion of the tipped mass to the left of C.G.P. is aided by a substantial trailing portion of the base which flexes downwardly and counterclockwise (FIG. 8) towards the underside of the base.

Even though C.G." is slightly "over-center" relative to the pivot axis, upon release of the deflecting force the delineator will automatically return to its fully upright position 20a. In particular, such slight over-center relationship is overcome by a relatively small (compared to FIG. 4) self-righting moment induced by the inherent spring-back or resiliency of the bent base portions adjacent to pivot axis C.G.P.

Although a portion of flange 28a (FIG. 7) is eliminated adjacent to pivot axis C.G.P., primarily to mechanically increase the flexibility thereat, the remaining bent base portions adjacent thereto will be suitably compressed/tensioned to induce self-righting. The self-righting moment need only be sufficient to return C.G." to the left of C.G.P. in FIG. 8 whereafter the influence of gravity will function to restore the delineator to its upright position. It should be further noted that the portions of the base between axis C.G.P. and P.P. will substantially remain in their same position in contact with the ground or pavement during the entire tipping cycle.

FIGS. 9 and 10 illustrate a third delineator embodiment 20b comprising a conically shaped delineating member 21b formed of substantially the same material as the above described delineating members. However, a base 22b is formed to exhibit a yet greater degree of flexibility and less resiliency than the FIGS. 5-7 base for purposes hereinafter described. The square-shaped base comprises an upwardly extending circumferential flange 28b and an inboard annular flange 29b defining an opening for receiving the cone 21b therein.

An annular flange 30b of the cone may be secured to the base of so desired. Pairs of aligned slits 31-32 and 33-34 are formed at least part way through the flange 28b and disposed vertically therein to mechanically increase the flexibility at selected portions of the base. Such flexibility aids in correctly positioning the shifting center of gravity C.G. to primarily induce the hereinafter described self-righting moment.

As noted in FIG. 11, when the base moves from its vertical or normal position 20b to its full down or substantially horizontal position 20"", rearwardly disposed pair of slits 31-32 function to permit a substantial trailing portion of the base to pivot counterclockwise toward the underside of the base. The center of gravity C.G." of the tipped mass tends to remain leftwardly and in under center relationship with respect to pivot axis C.G.P. Such positioning of C.G." primarily induces the self-righting moment due to the influence of gravity.
Simultaneously therewith, the forwardly disposed pair of slits 33-34 and adjacent base portions next to pivot axis C.G.P. are placed in tension/compression to provide a secondary inducement of the self-righting moment, depending on the desired resiliency designed into the base. Although in FIG. 11 the self-righting moment is primarily induced by the suitably calculated flexibility of the base, it should be understood that the base could be designed to exhibit increased resiliency adjacent to C.G.P. to primarily induce the self-righting moment. For example, variance of the width and depth of slits 31-34, changes in dimensions of the base and selective changes in the composition of the base material will largely determine the desired flexibility/resiliency relationship.

It should be noted that the drawings, and in particular FIGS. 4, 8 and 11, are primarily intended to illustrate the principles of this invention and do not necessarily reflect exactly calculated configurations thereof. For example, the flexed trailing portion of the base in FIG. 11 may require a larger volume for certain delineator applications to assure occurrence of the under center relationship of C.G." relative to C.G.P.

What is claimed is:

1. A normally upstanding marker comprising vertical tubular hollow post marker member having a horizontally disposed substantially flat rubber-like base means attached thereto exhibiting sufficient combined flexibility and elasticity to induce a self-righting moment for automatically self-righting marker when it pivots clockwise about a pivot axis of said base means upon deviation from its normally upstanding position to a position wherein said marker member approaches a horizontal position, the center of gravity of said marker being positioned at least closely adjacent to said base means, said pivot axis being positioned substantially within the confines of said base means to define a substantial base portion constantly remaining substantially horizontal and in contact with ground due to the flexibility of the base means when said base means is flexed and said marker member is tipped towards said horizontal position.

2. The invention of claim 1 wherein the self-righting moment for said marker is primarily induced due to the inherent elasticity of said base means which places upper portions of said base means, adjacent to said pivot axis, in progressively increased compression upon tipping of said marker member towards said horizontal position.

3. The invention of claim 1 wherein said self-righting moment for said marker is primarily induced due to the combined elasticity and flexibility of said base means which places upper portions of said base means, adjacent to said pivot axis, in progressively increased compression upon tipping of said marker member towards a horizontal position and simultaneously per-

mits a substantial trailing portion of said base means to flex downwardly counterclockwise toward an underside of said base means to urge the shifting center of gravity of the tipped portion of said marker toward an under center relationship relative to said pivot axis.

4. The invention of claim 1 wherein the self-righting moment for said marker is primarily induced due to the inherent flexibility of said base means which permits a substantial trailing portion of said base means to flex downwardly counterclockwise toward an underside of said base means to constantly maintain said center of gravity in under center relationship relative to said pivot axis.

5. The invention of claim 1 wherein said post is cylindrical in cross-section.

6. The invention of claim 5 wherein said post is at least substantially composed of a translucent material and comprises thin wall sections substantially throughout.

7. The invention of claim 5 wherein said post has light reflecting means secured thereon.

8. The invention of claim 7 wherein said light reflecting means comprises a light reflecting strip secured to said post.

9. The invention of claim 7 wherein said light reflecting means comprises at least one reflector attached to an upper, reduced neck portion of said post.

10. The invention of claim 5 wherein said base means is rectangular and is bordered by an upstanding ridge positioned on an upper side thereof.

11. The invention of claim 5 further comprising means forming a circular opening through said base means a bottom portion of said post positioned in said opening.

12. The invention of claim 11 further comprising an annular flange formed on a lower end of said post and abutting lower surface portions of said base means to prevent said post from moving upwardly through said opening.

13. The invention of claim 1 wherein the material of said base means has a tensile strength of 100 percent elongation approximating 100 lb. per in.².

14. The invention of claim 13 wherein said base means material has a tensile strength at 200 percent elongation approximating 140 lb. per in.².

15. The invention of claim 1 wherein the material of said base means has a specific gravity approximating 2.0.

16. The invention of claim 1 wherein the material of said base means comprises an elastomer having a high density metal admixed therein.

17. The invention of claim 16 wherein said metal is powder.

18. The invention of claim 16 wherein said metal is lead.

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