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Schradieck et al.

[11] **3,822,668**

[45] **July 9, 1974**

[54] **ROADSIDE WARNING DEVICE**

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[73] Assignee: **said Schradieck, by said Lehti**

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[21] Appl. No.: **363,025**

[52] **U.S. Cl.** ..... **116/63 P,** 40/125 N
[51] **Int. Cl.** **E01f 9/10**
[58] **Field of Search** ..... 116/63, 63 P; 40/125 N; 404/109

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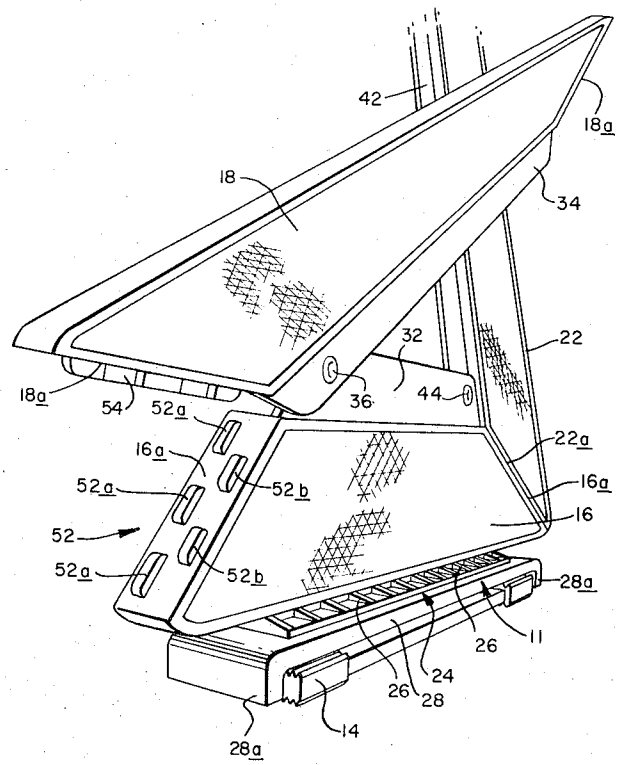
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Primary Examiner—Louis J. Capozi
Attorney, Agent, or Firm—Cesari and McKenna

[57] **ABSTRACT**

A foldable roadside warning device is composed of three reflective frame members, two of the frame members being of substantially equal length and being pivotally connected at their ends to the opposite ends of the third frame member. The first and second frame members are limited in their swing away from each other about their pivots so that they have to be forcibly spread apart in order for their free ends to meet one another. Interfitting surfaces on the free ends of the two frame members mate when the free ends meet so as to form a stable triangular frame which can then be supported upright in the roadway by a stand.

5 Claims, 6 Drawing Figures



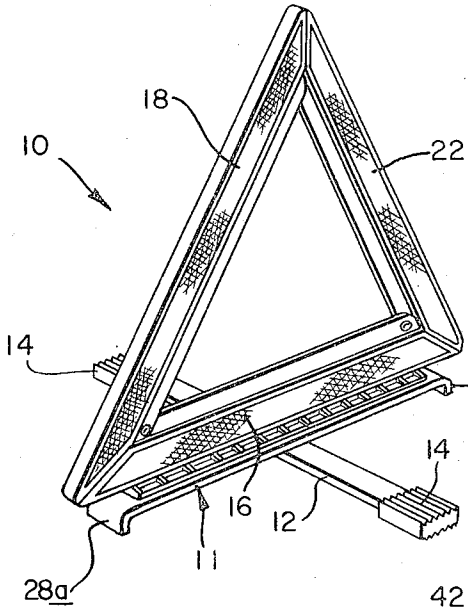

18
10
22
14
28a
14
16
12
11
28a

FIG. 1

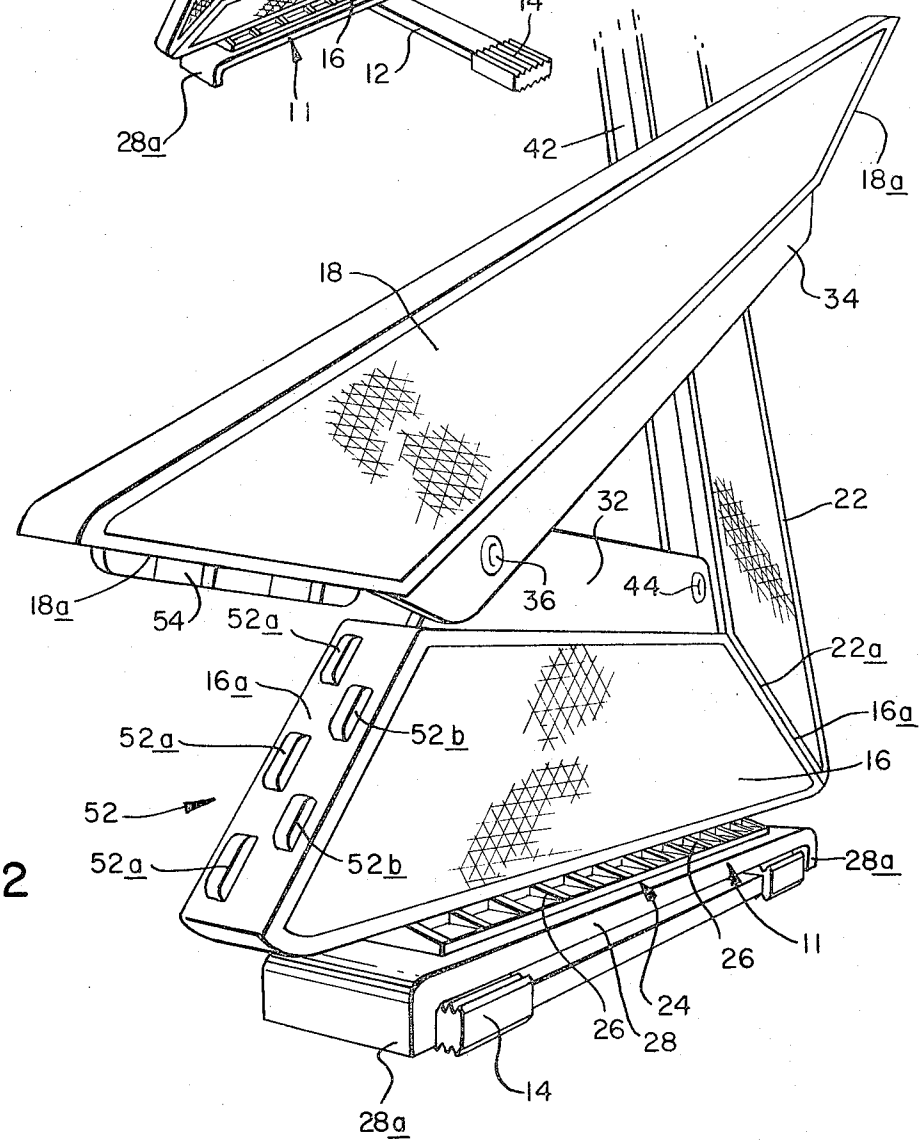

42
18a
18
34
32
22
36
44
18a
54
52a
22a
16a
16a
52a
52b
16
52
52a
52b
28a
11
26
24
26
28
14
28a

FIG. 2

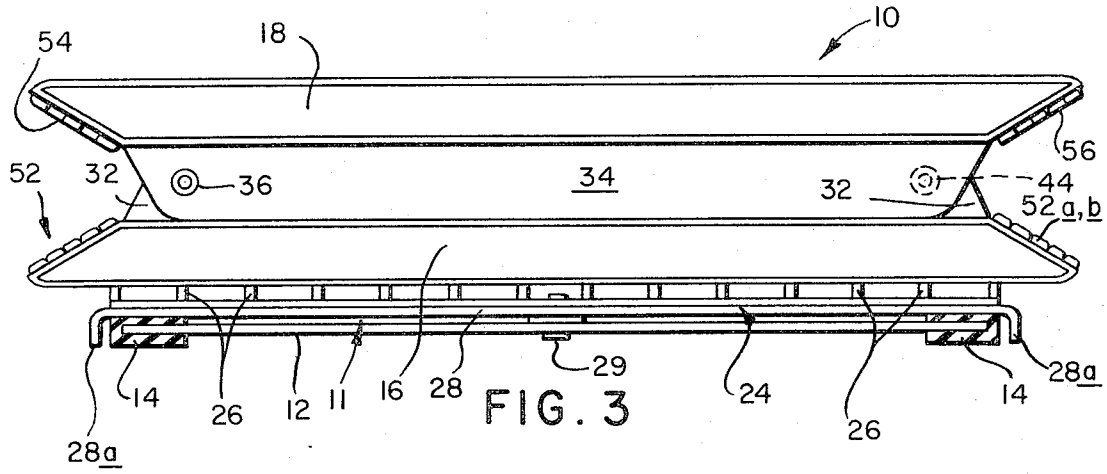


FIG. 3

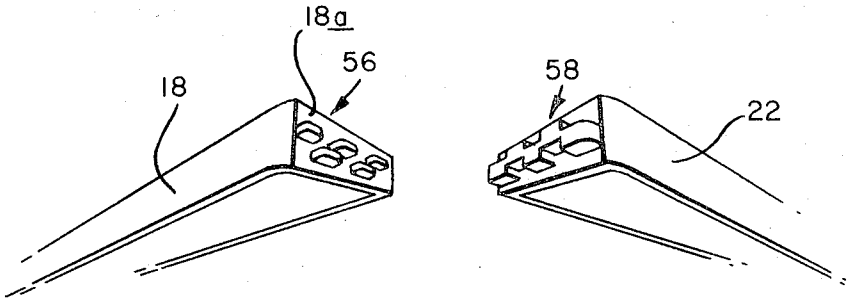


FIG. 4

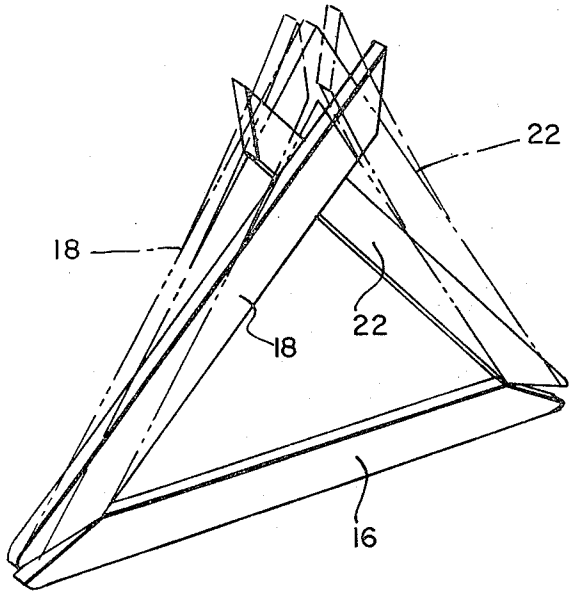


FIG. 5

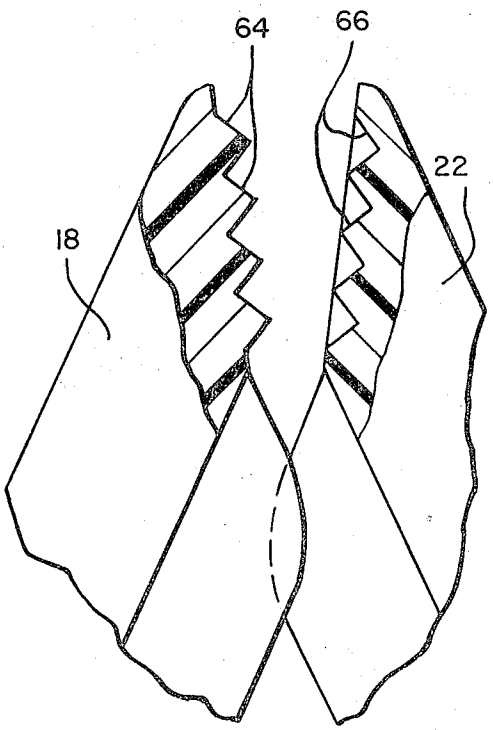


FIG. 6

ROADSIDE WARNING DEVICE

BACKGROUND OF THE INVENTION

This invention relates to a warning device which can be placed on the highway to warn motorists of a disabled vehicle or other hazard.

Roadside warning devices of this general type have been available for some years. In accordance with international custom, the device itself is more or less a triangular frame having a base of some kind which enables the frame to stand upright in the road. Usually the frame is covered with a retroreflective material so that the warning device can easily be seen from a relatively great distance. In addition, the warning devices are often foldable to a relatively compact package so that they can be stored under the driver's seat or in some other convenient place.

Conventional warning devices of this general variety have several drawbacks. When placed in the road, some are easily turned or tipped over by even moderate wind gusts. As a result they are no longer visible to approaching motorists. Others are not rugged or sturdy enough to withstand the rough usage to which they are subjected as they are repeatedly erected and stored by the user. Consequently, they have a relatively short useful life.

Perhaps the most serious disadvantage of the prior warning devices concerns the manner in which they are secured in their erected positions ready for use. The securement is invariably complex and very difficult to manipulate properly on a busy highway at night or in bad weather, when breakdowns commonly occur.

Typical of these prior securements are snap fasteners, hook-eye combinations, buttons and other such fixtures which are relatively difficult to manipulate in the dark, or with gloves on, or with very cold hands. In some cases, the motorist is completely unable to fold the device for storage with the result that he merely throws it into the vehicle in its erect position whereupon it becomes damaged and is therefore useless for the next emergency situation.

SUMMARY OF THE INVENTION

Accordingly, the present invention aims to provide a vehicle breakdown warning device which is very rugged and has a long useful life.

A further object of the invention is to provide a warning device of this type which can easily be erected and taken down even under adverse conditions.

A further object of the invention is to provide a warning device of the above type which remains erect when in use even when subjected to high winds.

Yet another object of the invention is to provide such a warning device which is easily seen by other motorists approaching from either direction on the road at night or under adverse weather conditions.

Still another object of the invention is to provide a warning device which is relatively easy and inexpensive to manufacture.

A principal object of the invention is to provide a foldable warning device of the above type which can be erected and taken down by the average driver even in the dark and under adverse weather conditions.

Still another object of the invention is to provide a device of this type which can be stored in a relatively small space.

Other objects will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts which will be exemplified in the following detailed description, and the scope of the invention will be indicated in the claims.

Briefly, the warning device is comprised of a bottom frame member and two side frame members which are pivotally connected to opposite ends of the bottom frame member so that the side frame members can be moved between a stored position in which they nest against the bottom frame member to an erect position in which their upper ends are secured together. The ends of the three frame members are mitred so that, in the erect position, the frame members form a closed triangular frame.

The bottom frame member is supported on a coextensive base having a leg which can be swung from a closed position in which it underlies the bottom frame member to an open position wherein it lies essentially at right angles to the bottom frame member. Thus the base and leg together form a stable platform which supports the frame in an upstanding position on the road.

On the other hand, when the side frame members are in their nested position adjacent the bottom frame member and the leg is oriented so that it underlies the bottom frame members, the entire device forms a relatively compact package which can be inserted into a suitable cover or bag and stored in an appropriate place in the vehicle.

The opposing mitred end faces of the side and bottom frame members are shaped to provide a toothed or tongue-in-groove engagement between the side frame members and the bottom frame member when the side frame members are in their erected position. This prevents relative lateral movement between the side and bottom frame members and thus lends a considerable amount of rigidity to the unit. In effect, then, the side and bottom frame members interlock when the device is in use so that minimal stress is applied to the pivotal connections between those members. Consequently, the frame members resist deflection or bending even when subjected to relatively high winds, on the order of 40 m.p.h. or more.

The securement of the upper ends of the side frame members to each other to lock the device in its erected position is of prime importance here. Instead of using the usual mechanical fasteners to connect these two members together, their mitred end faces are shaped with interlocking surfaces which interfit or mate with one another when the opposing frame member ends are pressed together. This mating engagement prevents relative lateral and vertical movements of the side frame members and therefore contributes greatly to the strength and rigidity of the frame.

Furthermore, the forces for maintaining the side frame members in mating engagement as aforesaid is provided solely by the configuration of the frame members themselves; absolutely no fixtures are required. More particularly, the lengths of the side frame members and their mitre angles are arranged so that in order to fit their upper ends together, the frame members must be swung outwardly beyond the points wherein their bottom ends engage the ends of the bottom frame member. In doing this, the side frame members are

flexed and their ends compressed against the ends of the bottom frame member. Consequently, when the side frame members are in register and released, they tend to resume their natural unstressed condition with the result that their mating upper ends are pressed tightly together.

As a result of the interfitting engagement of the three frame members, there is little, if any, movement of these elements with respect to one another. Consequently, when the device is in use, it is well able to withstand the bending and twisting forces to which it is normally subjected.

When one wishes to store the warning device, he simply pulls the upper ends of the two side frame members apart and offsets them slightly, then swings them down against the bottom frame member. This can be done quite easily even in the dark and with gloves on since there are no fasteners to manipulate.

BRIEF DESCRIPTION OF THE DRAWINGS

For fuller understanding of the nature and objects of the invention, it should be had to the following detailed description, taken in connection with the accompanying drawings in which:

FIG. **1** is a perspective view of the warning device, shown in its erected position, ready for use;

FIG. **2** is a perspective view of a larger scale with parts broken away, showing the FIG. **1** device in a partially folded condition;

FIG. **3** is a front view of the FIG. **1** device in its fully folded condition;

FIG. **4** is a fragmentary perspective view showing the securement at the top of the FIG. **1** device for locking the side frame members in their erected position;

FIG. **5** is a diagrammatic view illustrating the operation of the device, and

FIG. **6** is a fragmentary sectional view showing an alternative top securement for the FIG. **1** device.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now to FIG. **1** of the drawings, when erected in use, the warning device is in the form of a generally triangular frame shown generally at **10.** Frame **10** is supported in an upstanding position in the roadway by an underlying base **11** and a leg **12** pivotally attached to base **11** and oriented at right angles to the plane of frame **10.** Resilient, petrol-resistant caps or boots **14** are engaged over the ends of leg **12** so that the device does not slide along the ground on a windy night.

The frame is constructed of a suitable material such as ABS resin which is filled with a vivid red fluorescent material so that it constitutes a highly visible triangular band. Also, in accordance with present Department of Transportation MVSS No. 125 standards, the outer portion of each face of frame **10** is covered with a red retroreflector made of a suitable material such as acrylic, which forms a substantially continuous triangular outer band.

Frame **10** is on the order of eighteen inches on each side and the leg **12** is approximately the same length so that when the device is placed on the roadway, facing the oncoming vehicles, it presents a very visible warning signal to motorists. In accordance with present day practices, three of the devices are used, one positioned 100 feet in front of the disabled vehicle and one about 10 feet to the rear and one a hundred feet to the rear so that there is clear warning to motorists traveling in both directions. Due to its unique construction, the present warning device satisfies all of the government requirements concerning visibility, ruggedness, moisture resistance and ability to withstand relatively high winds without turning or tipping; yet is very easy to erect and take down.

Referring now to FIGS. **1** and **2,** frame **10** is composed of three main elements, a bottom frame member or section **16** and a pair of side frame members or sections **18** and **22.** The opposite ends of frame member **16** are formed with beveled surfaces or mitres **16***a*, giving that member a generally trapezoidal shape. Frame member **16** also includes a shorter depending pedestal **24** having a series of ribs or buttresses **26** extending between the pedestal and the underside of strap **16** proper which lend a considerable amount of structural strength and rigidity to that member. The frame members **16, 18** and **22** are each conveniently molded in two shell-like halves whose edges are then ultrasonically welded together.

Referring especially to FIG. **2,** pedestal **24** is secured to the upper face of a heavy generally rectangular steel bar **28** which is coextensive with the ends of frame member **16.** Pedestal **24** and bar **28** together comprise base **11.** The two ends **28***a* of bar **28** are turned down so that they protect the frame **16** from impacts and stabilize the device to some extent. Preferably, however, the ends **28***a* do not quite touch the ground so that boots **14** bear the entire weight of the device to minimize sliding.

Leg **12** is connected at its midpoint to member **28** by a pivot **29** (FIG. **3**) which is relatively tight so that leg **12** does not swing freely. The dimensions of the leg are such that when it is in its closed position shown in FIG. **2,** it lies directly under bar **28** and fits between the ends of the bar.

As best seen in FIG. **2,** a long rib **32** projects up from the top surface of the frame member **16.** The frame members **18** and **22** are pivotally connected to opposite ends of this rib. More particularly, frame member **18** has a long rib **34** projecting from its inside face. Rib **34** is pivotally connected to rib **32** by means of a rivet **36** or other comparable securement. Frame member **18** has beveled surfaces or mitres **18***a* at its opposite ends so that it too has a generally trapezoidal shape.

Frame member **22** is more or less a mirror image of frame member **18.** In other words, its opposite ends are beveled at **22***a* and it has a long integral rib **42** projecting from its inner face which is pivotally connected to rib **32** by means of a rivet **44.**

Frame members **18** and **22** can be swung down against the top of frame member **16** so that the device occupies a relatively small space, as shown in FIG. **3.** Also, the frame members **18** and **22** can be swung up to the triangular configuration shown in FIG. **1,** whereupon the beveled ends of frame member **16, 18** and **22** form tight mitre joints at the three corners of the triangular frame **10** as seen in FIG. **1.**

Referring particularly to FIGS. **2** and **3** in order to prevent frame members **18** and **22** from being bent or twisted relative to frame member **16,** their opposing mitres are arranged to interlock when the device is erected as in FIG. **1.** For this, a staggered array of tabs **52** is formed on each end surface **16***a*. In the present illustration, there are two rows of such tabs, three tabs **52***a* being in one row, and two tabs **52***b* being in the

other, the tabs in each row also being offset. In addition, the lower mitre surfaces of frame members **18** and **22**, to wit: surfaces **18***a* and **22***a*, have relatively wide projecting tabs **54**, only the tabs on frame member **18** being visible in the figures. Each tab **54** is positioned so that it lies directly opposite the space between the rows of tabs **52***a* and **52***b* at the corresponding end of frame member **16**. Thus, when frame member **18** is in the position shown in FIG. **1**, its tabs **54** fit snugly between tabs **52***a* and **52***b*, preventing relative sideways movement between frame members **16** and **22**. This construction minimizes deformation of the elements of the triangular frame **10** due to high winds and, consequently, it minimizes the stresses in the vicinity of rivets **36** and **44**.

Turning now to FIGS. **4** and **5** of the drawings, as noted previously, the frame members **18** and **22** are specially arranged so that they can be secured together at their upper ends without any special linkage or fixture. More particularly, the frame members and their mitre angles are dimensioned and arranged so that the frame members **18** and **22** can open naturally only to the solid line positions shown in FIG. **5**. In these positions, however, the upper ends of frame members **18** and **22** do not mate as in FIG. **1**. For this, the frame members must be forced apart slightly to the positions shown in dotted lines in FIG. **5** which have been exaggerated for clarity. This flexes the frame members slightly and compresses the frame member material at the opposing mitres at the base of frame **10** so that the frame members **18** and **22** are in a relatively highly stressed condition. Consequently, when the two frame member ends are placed opposite one another and released, the frame members tend to resume their normal unstressed condition and therefore press the two ends tightly together.

The upper end **18***a* of frame member **18** has a staggered array of tabs indicated generally at **56** which are more or less the same as tabs **52**. Tabs **58** on the upper end of frame member **22** fit between tabs **56** when the frame member ends mate as in FIG. **1**. The interfitting tabs **56** and **58** prevent relative vertical and lateral movement between the upper ends of the frame members as they are held together by the natural resilience of the frame members. These interfitting elements, at the top of the frame, can have a variety of shapes, one type being shown in FIG. **4** and another in FIG. **6**. The only requirement is that the elements mate to inhibit relative movement between the frame member ends. This insures that the erected frame **10** will be rigid and sturdy in use.

As best seen in FIG. **4**, the tabs **56** and **58** are positioned so that they are properly aligned when the frame member ribs **34** and **42** engage on another. Thus, to erect the frame, one simply has to spread the ends of frame members **18** and **22** apart as in FIG. **5**, cock them slightly until the ribs **34** and **42** make contact and then guide the two ends together; under these circumstances, the tabs **56** and **58** will automatically fit together.

When it is desired to fold the warning device for storage, the user simply pulls the tops of the frame members **18** and **22** away from each other slightly to disengage elements **56** and **58**. Whereupon, the frame members can be offset slightly and folded down against bottom frame member **16** as shown in FIG. **3**.

It will be seen from the foregoing, then, that the present warning device is quite rugged and reliable in use and can be set up and taken down even under adverse conditions with a minimum amount of effort. Furthermore, when folded, the device occupies a small amount of space and thus is easily stowed until needed. Yet, because it can be molded out of inexpensive plastic materials and assembled easily, its cost is relatively small.

It will thus be seen that the object set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described.

We claim:

1. A foldable roadside warning device of the triangular frame type comprising first, second and third elongated frame members, each said member having two opposite ends, pivot means connecting one said end of each of said first and second members to said opposite ends of said third member so that said first and second members can be swung from a closed position wherein their said other ends lie adjacent said opposite ends of said third member to an open position wherein their said other ends are spaced from said third member and touch each other to form a corner of said triangular frame, means on said one ends of said first and second members and said opposite ends of said third member which engage each other when said first and second members are swung partially to their open position to stop their further swinging movement so that said members must be flexed in order to reach said open position whereby their tendency to resume their unstressed condition biases said other ends together forming a rigid triangular frame, and means connected to one of said members for supporting the frame in an upright position.

2. The device defined in claim **1** wherein the supporting means comprise an elongated member pivotally connected to said third member so that it can be swung from a first position wherein it lies generally in the same plane as the frame and a second position wherein it is oriented at an angle with respect to the plane of the frame.

3. The warning device defined in claim **1** wherein said opposite ends of said three straps are beveled and butt against one another, forming mitre joints at the three corners of said frame.

4. The warning device defined in claim **3** and further including means for providing a toothed engagement between the butting beveled member ends adjacent the pivot means so as to minimize relative lateral movement between the pivotally connected members.

5. The warning device defined in claim **1** and further including ribs integral with said first and second members near their other said ends, said ribs engaging one another when said other said ends are aligned so as to guide them together.

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