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[54] **INFLATABLE WARNING DEVICE FOR ROADWAYS**

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[52] **U.S. Cl.** .....**116/63 P,** 40/125 N, 52/2

[51] **Int. Cl.** **E01f 9/10**

[58] **Field of Search** .....116/28, 63, 63 P, 114; 52/2; 40/125 L, 125 H; 94/1.5

[56] **References Cited**

UNITED STATES PATENTS

2,762,327	9/1956	Weig	116/63 P
2,800,099	7/1957	Baker	116/63 P
2,808,803	10/1957	Weig	116/63 P
2,874,826	2/1959	Matthews et al.	5/348
2,991,699	7/1961	Murray, Sr.	116/63 P
3,389,677	6/1968	Dunne	116/114 R
3,511,039	5/1970	Gould et al.	5/348 X

FOREIGN PATENTS OR APPLICATIONS

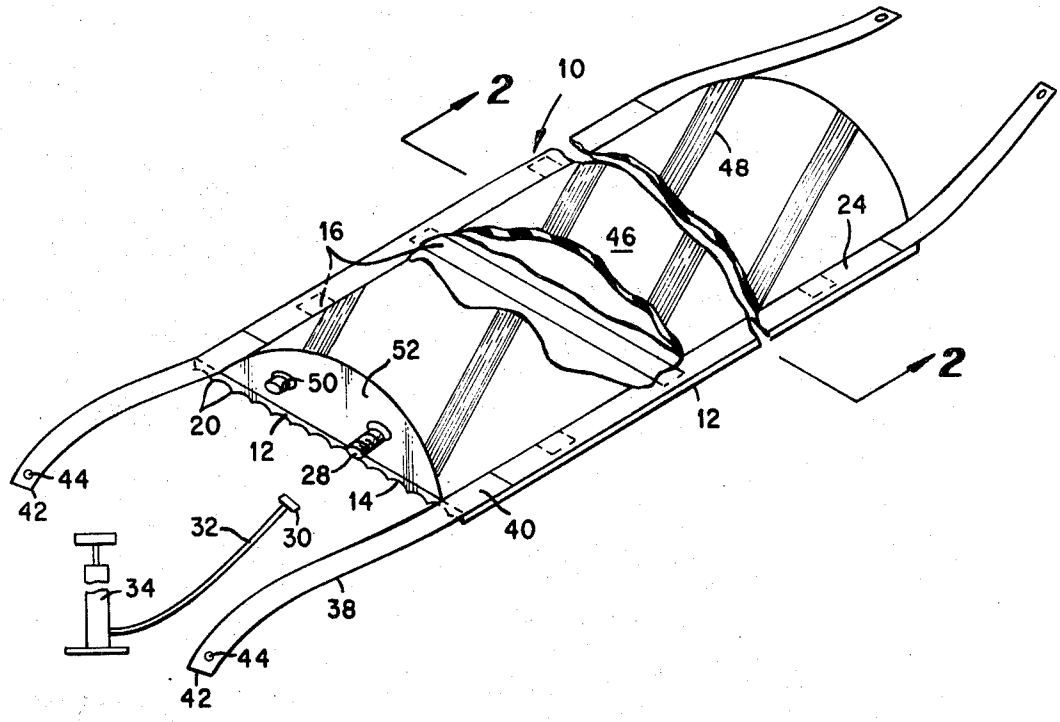
834,965	3/1952	Germany	116/63

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[57] **ABSTRACT**

An elongated inflatable warning device adapted to be removably disposed transversely of a roadway during selected periods for control of vehicular traffic.

8 Claims, 6 Drawing Figures



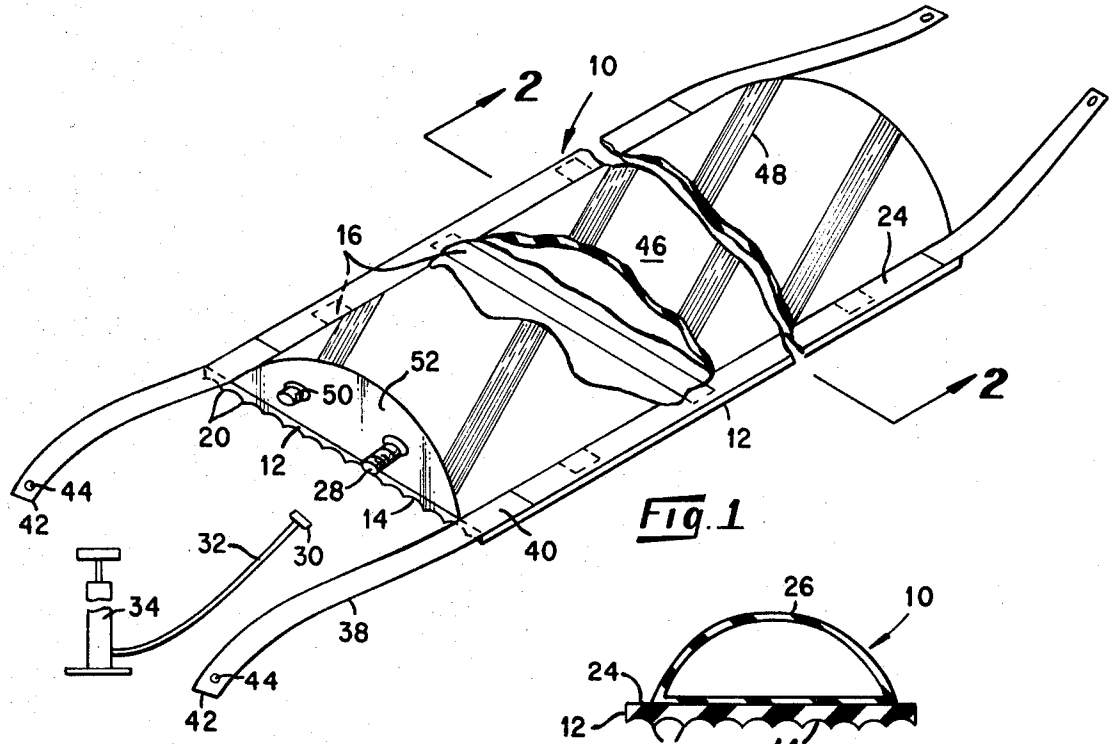


Fig. 1

Fig. 2

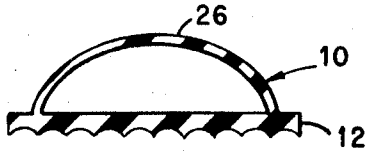


Fig. 3

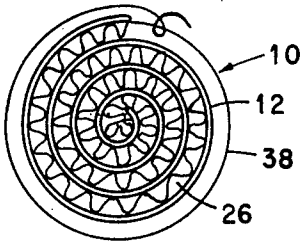


Fig. 4

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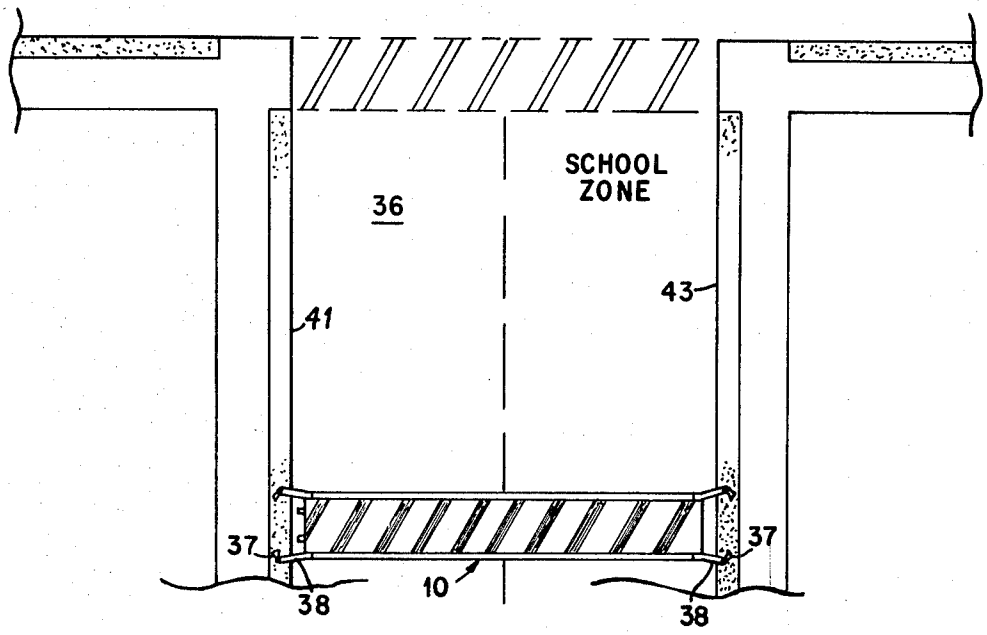


Fig. 5

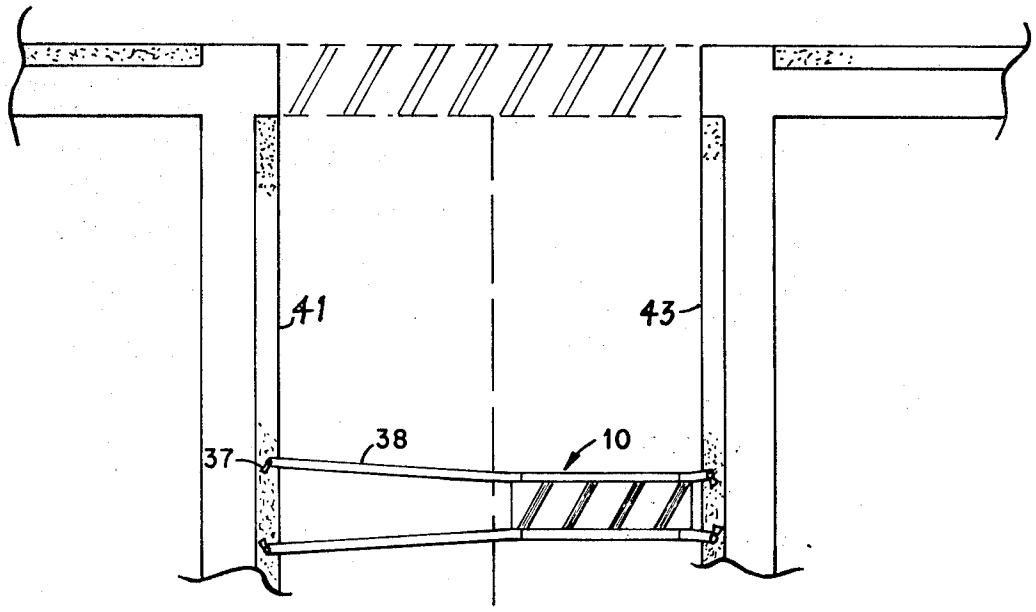


Fig. 6

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INFLATABLE WARNING DEVICE FOR ROADWAYS

This invention relates to roadway markers, particularly to removable devices adapted to be temporarily positioned across a roadway for affording a warning to vehicles of an impending dangerous condition.

Partly due to their frequency of occurrence and commonplace status, warning signals on roadways which foretell of an impending dangerous condition go largely ignored by a significant segment of the driving public. For example, such warnings as a painted "School Zone" on a roadway are too frequently ignored.

Rigid fixed obstructions extending transversely of a roadway have been employed heretofore as "speed breakers." Insofar as is known to applicant, these prior art structures are designed as permanent installations and thus are limited to use on roadways where there is a need or desire to keep the traffic moving at a slow pace at all times. These rigid prior structures are also notorious for their destructive effects upon vehicles and the danger of a driver losing control of his vehicle when striking or crossing the structure.

It is an object of this invention to provide a warning device adapted to be temporarily positioned across a roadway and which will neither adversely affect a vehicle passing thereover nor the driver's control over a vehicle. It is a further object to provide a warning device of the type described which creates an illusion of an obstruction across the roadway such that a driver of a vehicle approaching the device is caused to take notice of an impending dangerous traffic condition, but which is of a character suitable to permit a vehicle to safely pass thereover.

It is also an object of this invention to provide a warning device of the type described wherein the device may be removably secured in position across a roadway during a period of time when an impending dangerous condition exists and which may be readily removed from across the roadway when the impending dangerous condition has been removed.

Other objects and advantages of the invention will be recognized from the following description including the drawings in which:

FIG. 1 is a representation of a warning device including various features of the invention;

FIG. 2 is a sectional view of the warning device of FIG. 1;

FIG. 3 is a sectional view of a further embodiment of the warning device;

FIG. 4 is a side view of the warning device of FIG. 1 in rolled position;

FIG. 5 is a representation of a warning device disposed across all the traffic lanes of a roadway; and

FIG. 6 is a representation of a warning device disposed across less than all of the traffic lanes of a roadway.

Stated generally, the warning device of this invention comprises a relatively stiff, but flexible, planar base member adapted to be disposed on the surface of a roadway transversely thereof and having a flexible inflatable bag on the upper side thereof. When inflated, the flexible bag extends sufficiently above the surface of the roadway as will create an illusion of an obstruction across the roadway and cause the driver of an approaching vehicle to take special note of an impending dangerous traffic condition. Preferably the base member of the warning device is of sufficient thickness as will impart a slight, but perceptible, bump to a vehicle passing over the device thereby providing additional warning. The overall structure of the device, particularly the resiliency of the inflated bag, permits a vehicle to safely pass thereover without adverse effects upon the driver's control or upon the vehicle itself even though the vehicle is travelling at a relatively high speed. In accordance with another feature of the invention, the inflated warning device includes an exposed surface which displays a colored warning signal to an approaching driver thereby contributing to and emphasizing the illusory effect. Still further warning in another embodiment is provided by incorporating an air-pressure activated signal into the inflatable bag so as to provide an audible warning as the wheels of a vehicle pass over the device.

With reference to the Figures, the inflatable warning device **10** preferably comprises a generally planar base **12** which is constructed of a tough, abrasion resistant, but flexible, material such as a synthetic resin or fibrous mat. Such materials as nylon, polyethylene, and rubber have been found suitable in fabricating the base **12**.

Desirably, the base **12** is of sufficient thickness as will impart sufficient rigidity to the warning device as will cause it to lay flat on a roadway but be flexible enough to allow the device to be formed into a roll for storage when not in use. A base formed of rubber of about ¼ inch thickness serves suitably in that it is sufficiently flexible as desired and also resists abrasion and penetration by foreign objects which might puncture the inflatable bag.

The transverse rigidity of the base **12** is of particular importance in that it desirably retains a planar geometry when the bag element of the device is inflated as will be discussed hereinafter. In accordance with one embodiment, the base **12** is reinforced in its transverse dimension as by incorporating a plurality of spaced-apart elongated slats or ribs **16** therein. Preferably the slats **16** comprise thin strips of metal disposed transversely of the base and embedded in the base. Alternatively, the slats are secured on one or both of the outer surfaces of the base. As thus reinforced, the base is readily formed into a roll (see FIG. 4) by commencing at one end of the elongated device and rolling it in its longitudinal direction. The transverse slats **16** do not interfere with such rolling but due to their position transverse of the base, the slats impart transverse rigidity to the base and aid in maintaining it flat on the roadway.

The bottom **14** of the base **12** preferably presents a roughened surface so that when the warning device is positioned on a roadway such as the asphalt or concrete surface of a street or highway, there is a reduced tendency of the device to slip out of position when run over by the wheels of an automobile or similar vehicle which is traveling on the roadway. Various kinds of surfaces on the bottom **14** of the base **12** provide the desired frictional contact between the warning device and the roadway. Elongated protrusions or a roughened surface increase the ability of the warning device to remain stationary when run over by a vehicle. One particularly suitable bottom surface **14** of the base **12** is provided by forming a plurality of adjacent ribs **20** extending generally parallelly one to the

other and to the longitudinal dimension of the warning device along substantially the entire length of the base thereof. The parallel longitudinally extending ribs provide lines of frictional engagement between the base **12** and a supporting roadway surface so that when a vehicle passes over the device **10**, the device does not move out of its assigned position.

As illustrated, the base **12** is provided on its upper surface **24** with a collapsible bag **26**. As best seen in FIG. **2**, the illustrated bag **26** is secured to the upper surface **24** of the base member **12** as by suitable adhesive thereby making the production of the illustrated warning device relatively simple and inexpensive. Relatively thin-walled rubber tubing, cut to length and sealed at its ends provides a suitable bag **26** and is readily bonded to many different base materials employing well-known adhesives. Alternatively, the bag **26** is integrally formed with the base **12**, and the base and bag are produced simultaneously as by extruding these members as a single unit from a material such as rubber or synthetic resin. A device fabricated in accordance with this latter technique is illustrated in cross-section in FIG. **3**. However, by making the bag **26** as a unit separate from the base **12**, greater latitude in the choice of materials for each of these members is obtainable.

In one of the ends of the bag **26** there is provided valve means **28** adapted to be connected to means for inflating the bag, such as the exhaust end **30** of a hose **32** joined to a hand pump **34**. Other pump means such as the common foot pump employed to inflate air mattresses and the like also provide suitable means for inflating the bag **26**. Upon actuation of the hand pump **34**, air is pumped through the valve means **28** into the bag **26** to inflate the same. As noted, the preferred bag **26** is of wall thickness less than the thickness of the base **12** and/or the base **12** is reinforced as by slats, hence possesses less flexural rigidity than the base **12**, particularly in the transverse direction. By reason of the different flexural rigidities of the base member **12** and the bag **26**, as the bag **26** is inflated by the increasing air pressure therein, the base member **12** remains substantially in its planar geometry while the more flexible bag **26** expands to form a generally arcuate upper surface on the warning device. When the bag is inflated, the exhaust end **30** of the hose is removed from valve means **28** and the valve is closed as by means of a suitable cap (not shown) threadably secured on valve means **28** to prevent escape of the air from within the bag **26** while the device is in use.

When the warning device has served its purpose and is ready for removal from the roadway, the cap is removed from the valve means **28** and the air within the bag escapes through the valve means. Thereupon the entire device can be formed into a roll (see FIG. **4**) for ready transport and storage.

In use, the warning device **10** is disposed transversely of a roadway **36** with the bottom surface **14** of the base **12** in contact with the roadway. In the illustrated device, the base **12** is provided at either of its ends and on opposite side margins thereof with one or more elongated straps **38** having one of their ends **40** securely fastened to the base **12** and extending therefrom to serve as a tie down for the warning device. The unattached ends **42** of the illustrated straps **38** are provided with openings **44** through which a peg **37** or the like may be driven. When the warning device is in position on the roadway, the straps **38** are pulled taut and a peg is driven through each of the openings **44** in the ends **42** of the straps and into the earth at opposite curbs **41** and **43** of the roadway to assist in maintaining the warning device in its position transversely of the roadway. As illustrated in FIG. **5**, the disclosed device is disposed across all the traffic lanes of a roadway. Alternatively, the device is of a length sufficient to cause it to extend across a single traffic lane. In the latter instance, the straps **38** on one end of the base **12** are lengthened sufficiently to extend across the roadway to the opposite curb **41** as illustrated in FIG. **6** and be secured to tie the warning device in the desired position.

In one suitable warning device, the base member **12** is fabricated of rubber which is 12 inches wide, one-fourth inch, and 8 feet long. A flexible tubular rubber bag **26** of 1/32 inch wall-thickness is secured to the top surface **24** of the base employing conventional rubber cement. When inflated, the bag **26** assumes a generally convex geometry and extends above the roadway level to a vertical height of about 5 inches. When positioned across a roadway and viewed by the driver of an oncoming vehicle, the inflated device presents the appearance of a substantial obstruction in the roadway thereby causing the driver to take precautions such as reducing the speed of his vehicle and keeping a more alert lookout.

As noted, when the warning device is secured across a roadway and the bag **26** is inflated, the bag presents an exposed surface **46** directly in view of the driver of an approaching vehicle. In accordance with one feature of the invention, this readily viewable exposed surface is provided with a colored warning such as the well-known black stripes **48** on a yellow background. For economy of manufacture, the bag **26** may be formed of a yellow material and the black stripes **48** painted thereon during a subsequent manufacturing operation. The brightly colored exposed surface **46** of the inflated bag attracts the driver's attention if he is maintaining an appropriate lookout for impending road conditions.

In the event the driver fails to be attentive to the presence of the present device in the roadway and passes thereover, the wheels of his vehicle contact the inflated bag **26** which yields under the weight of the wheels of the vehicle thereby allowing the vehicle to pass safely thereover without damage to the vehicle and without causing the driver to lose control over the vehicle. The thickness of the base (plus the thickness(es) of the bag wall) imparts a slight bump effect to the vehicle thereby arousing the driver and causing him to take note of the existing roadway condition. This bump effect is repeated when the rear wheels of the vehicle pass over the warning device, thus emphasizing the warning to the driver.

In accordance with a further feature of the invention, a pressure-sensitive audible signaling device **50** is provided in one end **52** of the inflatable bag **26**. In the course of the passage of vehicle wheels over the bag when it is in its inflated state, the pressure of the air within the bag is increased due to compression of the bag by the vehicle wheels. This increased pressure exceeds the preselected pressure required to actuate the signal device **50** and air escapes the bag through the

signaling device **50**, actuating the device and generating a signal which may be heard by the operator of the vehicle. The duration of the signal generated by the device is momentary by reason of the fact that the vehicle wheels pass over the inflated bag in a very brief span of time and the actuation pressure for the signal device **50** is exceeded only for a like brief period of time. Consequently, the signal is sudden and of a kind which will attract the attention of the operator. This audible signal, therefore, serves to provide additional warning to the driver of an impending dangerous traffic condition.

The disclosed warning device is readily positioned across a roadway during those periods when unusual traffic conditions exist. Similarly, the warning device is readily removed when the dangerous traffic condition has passed and may be rolled into a compact unit for transporting and storage purposes. As may be seen in FIG. **5**, one or more of the straps **38** may be employed to tie the rolled warning device thereby securing it against unrolling while in storage or transport. The warning device is particularly useful for providing warning on roadways where the traffic desirably travels at a relatively fast speed during periods of normal traffic conditions but where a dangerous, but temporary, traffic condition exists. For example, road repair crews can keep several of the disclosed warning devices rolled into compact rolls and stored in their trucks for immediate placement across a roadway to alert traffic to the presence of the repair crew. In this connection, the words "ROAD REPAIR CREW" painted on the exposed surface of the inflated bag are appropriate. Similarly, the disclosed warning device is of sufficiently light weight as permits it to be carried and placed in position across a roadway by a small child such as a school Safety Patrolman. Because of the ease with which the warning device can be put in place and subsequently removed, it is particularly suited for use at or near school crossings during only the times when children are present.

While several embodiments have been shown and described, it will be understood that there is no intent to limit the invention by such disclosure, but, rather, it is intended to cover all modifications and alternate constructions falling within the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A warning device adapted to be disposed generally transversely of a roadway for indicating a traffic condition comprising an elongated flexible planar base means including a bottom surface adapted to frictionally engage said roadway, inflatable means on the upper surface of said base member and including a wall portion which is proportioned to extend above and along the length of said base means when said means is inflated to provide a depressible projection above the surface of said roadway in the path of vehicular traffic on said roadway and to provide a surface exposed to the view of an operator of an oncoming vehicle and creating an illusory obstruction to vehicular traffic, thereby alerting the vehicle operator to unusual attention to the traffic condition, said wall portion having a flexural rigidity less than the flexural rigidity of said base means and being adapted to lie in proximity to said base means when said inflatable means is deflated, whereby said warning device may be reduced to a geometry other than elongated for storage but said more rigid base supports said inflatable means in position on said roadway.

2. The warning device of claim **1** and including means adapted to aid in securing said warning device in position on said roadway.

3. The warning device of claim **2** wherein said means securing said warning device in position on said roadway comprises at least two elongated straps secured at one of their respective ends to each of the opposite ends of said base means and adapted to be secured at their respective unattached ends at points spaced from each other and from said base means.

4. The warning device of claim **1** and including audible signal means in said inflatable bag means whereby the passage of vehicular traffic over said warning device forces air through said audible signal means and produces an audible signal.

5. The warning device of claim **1** wherein said exposed surface of said inflated bag includes warning indicia thereon.

6. The warning device of claim **1** wherein said inflatable bag is formed independently of said base means and thereafter bonded thereto by adhesive means.

7. The warning device of claim **1** and including means reinforcing said base member at least in its transverse direction.

8. The warning device of claim **7** wherein said reinforcing means comprises a plurality of elongated slats disposed transversely of said base member.

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