United States Patent [19]

Humphrey

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[54] **ROADWAY BARRIER**

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[52] **U.S. Cl.** **256/64**; 256/1; 404/6

[51] **Int. Cl.** **E01f 3/00**

[58] **Field of Search** ..... 256/1, 64, 13.1; 404/6, 404/7, 9; 116/63 P

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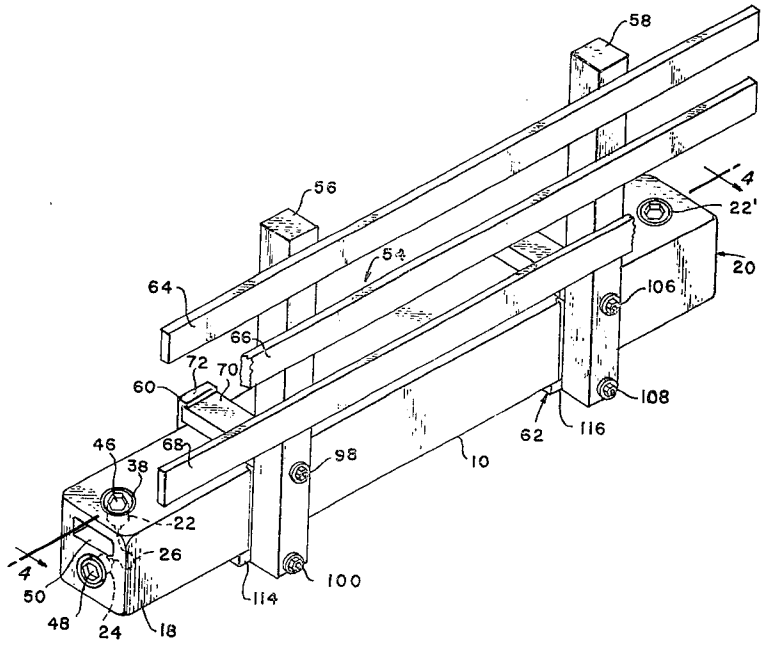
[57] **ABSTRACT**

A barrier for roadways or the like including an elongated, hollow base member adapted to be filled with liquid and a barricade structure fastened to frame members which are secured laterally around the base. The barricade structure may either be bolted to the frame or held against the frame by means of hinged straps.

16 Claims, 12 Drawing Figures



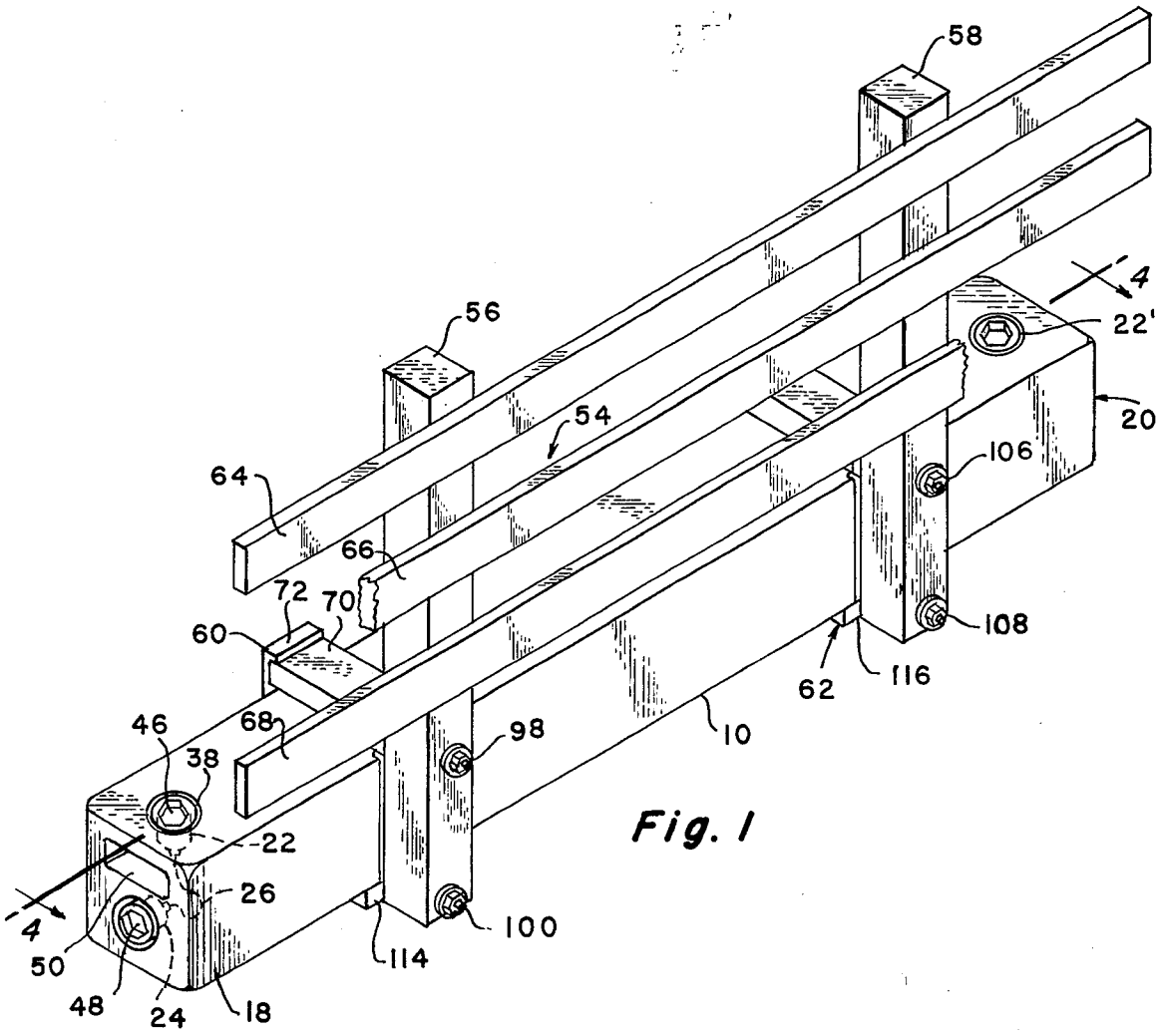


Fig. 1

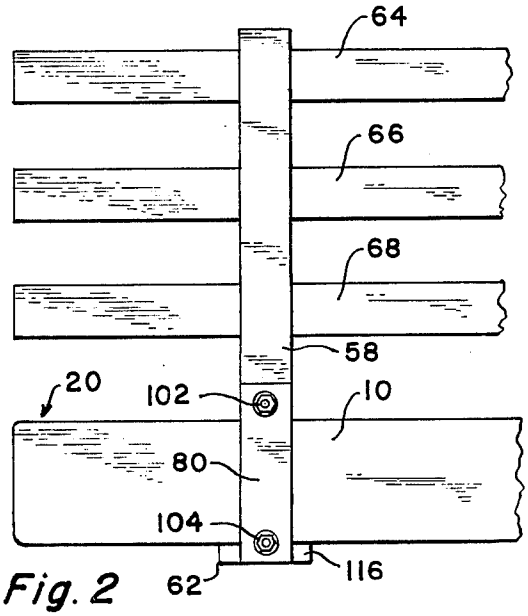


Fig. 2

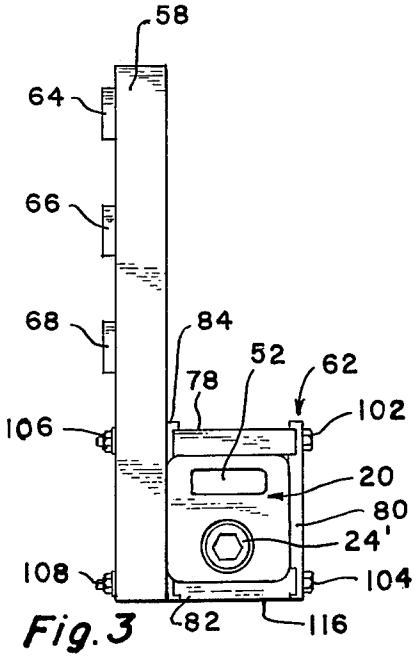


Fig. 3

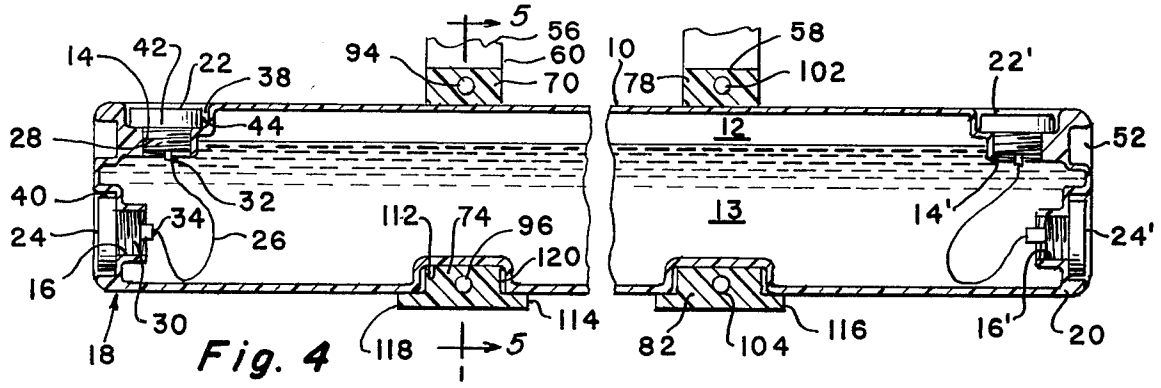


Fig. 4

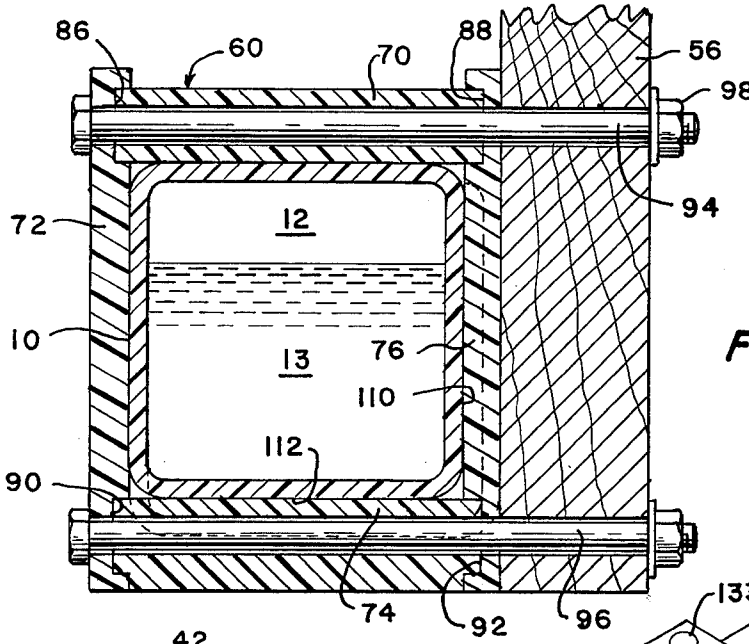


Fig. 5

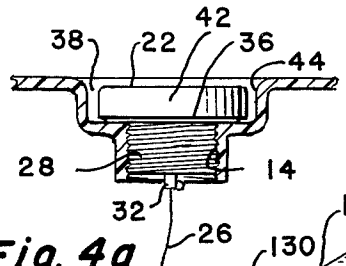


Fig. 4a

Fig. 6

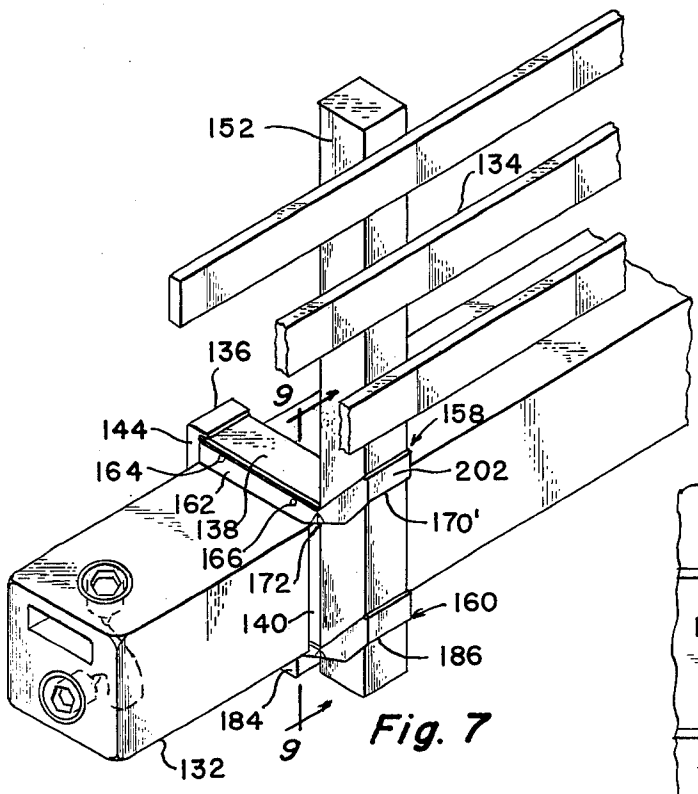


Fig. 7

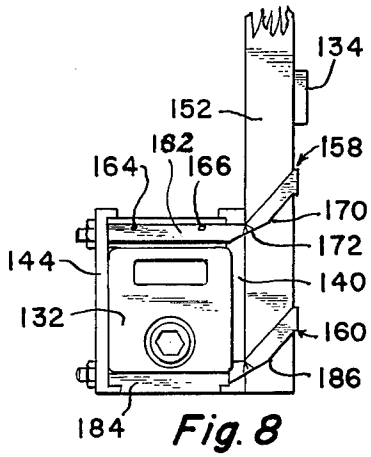


Fig. 8

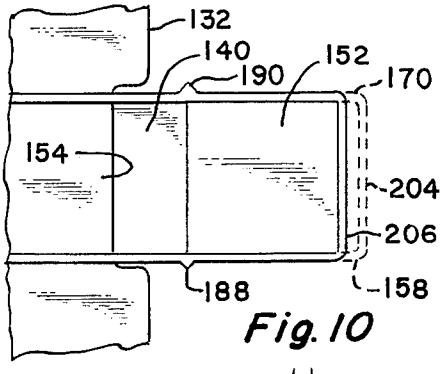


Fig. 10

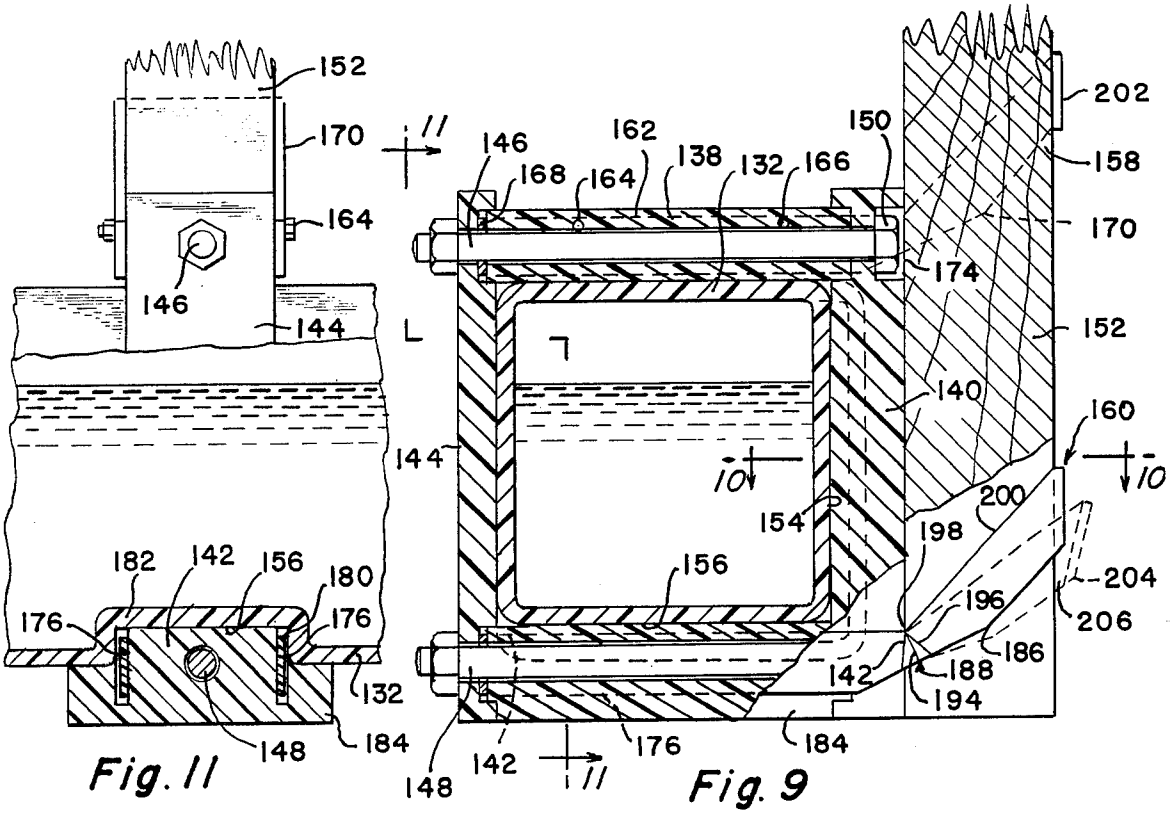


Fig. 11

Fig. 9

ROADWAY BARRIER

BACKGROUND OF THE INVENTION

The maintenance, repair or construction of new roadways almost invariably involves the creation of conditions hazardous either to the personnel working on the roadway or traffic passing in close proximity to the roadway under construction. Also, construction involving a roadway will often require that traffic be re-routed to another highway or to unaffected portions of the highway under consturction.

To re-route the traffic around the construction site or to prevent traffic passing in close proximity thereto from driving off the usable portion of the road to the detriment of either the driver or those working on the road, it is often necessary to set up barricades which serve to channel the traffic away from the hazardous area. Since several miles of highway will often be under construction, it is a fairly large task to erect the necessary number of barricades. One of the chief problems is the fact that each of the barricades must be large enough to be seen by the motorist as well as heavy enough to safely slow down or stop a vehicle which fails to avoid the barricade. Another problem is the fact that a barricade of sufficient mass to stop a moving vehicle is quite difficult to transport to the construction site as well as position or reposition it once it is on the job. In fact, the latter often requires the use of a crane which is both time consuming and expensive to operate. Another difficulty with most barricades is that they are difficult to transport and store in bulk due to their size and shape.

OBJECTS OF THE INVENTION

It is therefore, an object of this invention to provide a roadway barrier including a lightweight, hollow base member which may be filled with liquid to render it extremely massive or emptied to permit it to be easily positioned and transported.

Another object of this invention is to provide a roadway barrier of sturdy construction, yet requiring a relatively minimal amount of material for its manufacture.

A further object of this invention is to provide a roadway barrier which may be rapidly disassembled to permit efficient storage and transportation in bulk.

A still further object of this invention is to provide a roadway barrier which may be readily and economically manufactured.

Yet another object of this invention is to provide a roadway barrier having a tamper-proof means for filling and evacuating the liquid reservoir.

A still further object of this invention is to provide a roadway barrier which may be used in conjunction with a vertical barricade structure or, alternatively, as a portable curb.

An additional object of this invention is to provide a roadway barrier primarily made of a material other than wood thereby lessening ecological impact, decreasing maintenance requirements for the barrier and reducing the chances of injury should the barrier be struck by a vehicle.

SUMMARY OF THE INVENTION

The barricade of the present invention is particularly adapted for use on roadways or the like and includes a substantially rigid base having a liquid reservoir therein and an attachment on the base for securing a barricade structure thereto. Means for permitting a liquid to be introduced into and evacuated from the reservoir as well as caps for sealing the reservoir are also provided.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of one embodiment of the invention, a portion thereof being broken away to disclose details of construction;

FIG. **2** is a rear elevational view of the embodiment illustrated in FIG. **1**;

FIG. **3** is an end elevational view of the embodiment illustrated in FIG. **2**;

FIG. **4** is a sectional view taken along line **4—4** of FIG. **1**, and viewed in the direction of the arrows;

FIG. **4***a* is an enlarged sectional view of the filler cap forming a part of the present invention;

FIG. **5** is an enlarged sectional view taken along line **5—5** of FIG. **4**, and viewed in the direction of the arrows;

FIG. **6** is a perspective view of a second embodiment of the invention;

FIG. **7** is a fragmentary perspective view of a third embodiment of the invention;

FIG. **8** is an end elevational view of the embodiment of the invention illustrated in FIG. **7**;

FIG. **9** is an enlarged sectional view taken along line **9—9** of FIG. **7**, and viewed in the direction of the arrows;

FIG. **10** is a fragmentary sectional view taken along line **10—10** of FIG. **9**, and viewed in the direction of the arrows;

FIG. **11** is a sectional view taken along line **11—11** of FIG. **9**, and viewed in the direction of the arrows.

FIGS. 1 THROUGH 5

The barrier includes a hollow, elongated, rectangular parallelipipedal base **10** preferably made of an impact resistant sturdy plastic such as one of the polyolefins, i.e., polyethylene, polypropylene or an acrylonitrile-butadiene styrene resin of the class commonly known as an ABS resin.

The primary requirements of the base material are that it be impervious to liquid and sufficiently rigid and sturdy to maintain its shape when filled with water or other liquids or fluid-like material. As already mentioned, the base **10** is hollow so as to provide a reservoir **12** therein for the purpose of containing a liquid **13** such as water which will impart a degree of mass to base **10** depending on the level to which reservoir **12** is filled.

Base **10** is provided with a pair of passageways **14** and **16** at one end **18** and identical passageways **16'** and **18'** at its other end **20** for the purpose of admitting water to reservoir **12** as well as emptying the same. Normally the reservoir **12** will be filled through passageway **14** and evacuated through passageway **16**, the latter being achieved through gravity and requiring no pumping.

Each of the passageways **14, 16** are sealed by means of caps **22** and **24**, respectively, which are threadedly secured to their respective passageways. In order to prevent the caps **22** and **24** from being lost when they are removed, they are joined together by means of a nylon line **26** which is secured to their bases **28, 30** by means of swivels **32** and **34** which serve to prevent line twist when the caps **22** and **24** are screwed or un-

screwed. The caps 22 and 24 are further provided with a resilient washer 36 as illustrated in FIG. 4*a*.

It is preferable that the caps 22 and 24 be peripherally enclosed by recesses 38 and 40, respectively, when tightened and that the clearance between the heads 42 of the caps and the recess walls 44 (see FIG. 4*a*) be sufficiently small to prevent one from inserting his fingers therein and removing the caps 22 and 24. By these means, caps 22 and 24 could be removed only by a special tool adapted to fit the recesses 46 and 48, which may be hexagonal, octagonal, etc. Permitting the caps 22 and 24 to be removed only through the use of a special tool renders the barricade relatively tamper-proof to children, etc., as well as theft proof, the latter due to the fact that the base 10 is extremely heavy when filled with water and must normally be emptied before it is manually moved.

Caps 22′ and 24′, associated with passageways 14′ and 18′, are of similar construction and operation.

Each of the ends 18 and 20 of base 10 are provided with external recesses 50 and 52, respectively, which serve as hand holds to facilitate the manual carrying of the barrier.

The barrier may include a barricade structure 54 which comprises a pair of vertical post members 56 and 28 secured to base 10 by means of frames 60 and 62 and lateral slats 64, 66 and 68 which may be nailed, bolted or otherwise fastened to vertical posts 56 and 58. It should be noted that, while normal usage will dictate the use of unyielding material such as wood or steel in the barricade structure 54, it may often be desirable to employ a frangible or shock absorbing barricade to prevent serious injury should a motorist crash into the barricade.

Frames 60 and 62 include cooperating members 70, 72, 74, 76 and 78, 80, 82, 84, respectively. As best illustrated in FIG. 5, member 70 fits into the recesses 86 and 88 of members 72 and 76, respectively, while member 74 fits into recesses 90 and 92 in members 72 and 76. Bolt 94, which passes through vertical post 56, members 76, 70 and 72 and bolt 96 which passes through vertical post 56, structural members 76, 74 and 72 serve to hold the members 70, 72, 74 and 76 in a rigid assembly encircling base 10 in a lateral direction when nuts 98 and 100 are tightened. Bolt and nut assemblages 94, 98 and 96, 100 are also employed to draw the vertical post 56 against frame member 76. Bolt and nut assemblages 102, 106 and 104, 108 cooperate with interfitting frame members 78, 80, 82 and 84 to form the rigid frame 62 and draw vertical post 58 against member 84 in a similar manner. In order to prevent the barricade 54 and frames 60 and 62 from shifting longitudinally on base 10, frame members 76 and 74 are positioned in recesses 110 and 112 in base 10. Members 84 and 82 of frame 62 are positioned in similar recesses in base 10 near its other end 20. It is preferable that frame members 74 and 82 be provided with longitudinal flanges 114 and 116, respectively, in order that the load on these members be distributed over a wider area if the filled barrier is lifted by means of barricade structure 54. Also, it is preferable that there be clearances 118 and 120 between the walls of recess 112 and frame member 74 to permit vertical post 56 to be held against frame 60 by means of a strap or the like as will be described below. There should be similar clearances between member 82 and its corresponding recess to accomplish a similar purpose.

The device is utilized as follows:

The barrier will normally be transported and stored with the base member empty of water and the barricade structure removed to facilitate manual handling and storage in bulk. The barricade 54 may be removed by first removing nuts 98, 100, 106 and 108 and sliding the vertical posts 56 and 58 off their respective retaining bolts 94, 96, 102 and 104. The nuts 98, 100, 106 and 108 may then be screwed down on their respective bolts 94, 96, 102 and 104 until they abut frame members 76 and 84. It should also be noted that the base 10 could be employed as a portable curb or the like, either with or without frames 60 and 62 depending on the circumstances.

Once the barrier is placed in the desired location, cap 22 is removed and the reservoir 12 filled with water or another liquid until the base 10 has acquired sufficient mass to satisfy the requirements of the particular situation. Cap 22 is then replaced and tightened down on washer 36. Depending on the amount and size of equipment available, the barrier may be repositioned when full by the attachment of a crane hook or cable to barricade structure 54 and lifting it off the ground, or it may be emptied of water by removing cap 24 and then repositioning the barrier manually.

FIG. 6

Another manner in which the barrier of FIGS. 1 through 5 could be employed is illustrated in FIG. 6.

In this modification, the base 122 is identical to base 10 illustrated in FIGS. 1 through 5, but the frames 124 and 126 have been rotated 90° about the longitudinal axis of the base and the barricade structure has been removed. The modified position of the frames 124 and 126 permits the bolts 128, 130, 131 and 133 to point downwardly thereby permitting their being anchored in the ground, road, or parking lot surface.

It should be noted that the conversion of the barrier shown in FIGS. 1 through 5 to the barrier shown in FIG. 6 may be accomplished merely be removing the barricade structure 54, disassembling the frames 60 and 62, rotating then 90° about base 10 and then reassembling the frames 60 and 62. In this manner the barrier may be converted to a portable curb or the like having means for anchoring it to the road surface.

FIGS. 7 THROUGH 11

A second modification of the roadway barrier illustrated in FIGS. 1 through 5 involves the means for attaching the barricade structure to the frame assembly. The barrier includes a base 132 and barricade structure 134 of the type employed in the road barrier of FIGS. 1 through 5. A frame assembly 136 including interfitting members 138, 140, 142 and 144 is positioned around base 132 and held together by means of bolts 146 and 148 in a manner similar to the frames 60 and 62 shown in FIGS. 1 through 5. The head 150 of bolt 146 is countersunk in member 138 to permit the vertical post 152 to lie flush against member 140. Bolt 148 is countersunk in a similar manner. In order to prevent the frame and barricade assembly 136, 134 from shifting longitudinally along base 10, frame and members 140 and 142 are positioned in recesses 154 and 156, respectively. It should be noted that the other end of base 132 is also provided with a frame and vertical post assembly similar to the one just described.

Instead of bolting the vertical post 152 to the frame 136, the barrier is provided with a pair of retaining straps 158 and 160 which are secured to frame member 138 and 142, respectively. Strap 158 has a first U-shaped portion 162 bordering three sides of member 138 and secured thereto by means of bolts 164 and 166 passing through member 138 and retained by means of nuts (not shown) on the opposite side thereof as well as bolt 146 which passes through a rear hole 168 in strap portion 166. Strap 158 further includes a second U-shaped portion 170 which extends beyond frame 136 so as to receive the vertical post 152 of barricade structure 134. The second U-shaped portion 170 is connected to the first U-shaped portion 162 by means of a pair of flexible hinges 172 and 174.

Retaining strap 160 includes a first U-shaped portion 176 positioned in the gap between frame member 142 and the walls 180 and 182 of recess 156 and the gap between members 142 and 144. The first portion 176 of strap 160 is retained in this position by means of the flange 184 of member 142. Strap 160 further includes a second U-shaped portion 186 extending beyond frame 136 to enclose vertical post 152. The second portion 186 is connected to the first portion 176 by means of a pair of hinges 188 and 190.

It should be noted that a similar retaining strap arrangement is employed to secure the other post (not shown) of barricade 134.

In a preferred design, the straps 158 and 160 are made of a plastic having good elastic properties, i.e., after deformation, it will return to its undeformed state and shape and will continue to do so even after numerous deformations. Polypropylene is one such plastic having these characteristics. As previously mentioned, the U-shaped portions 170 and 186 which encircle the barricade post 152 are connected to the first U-shaped portions 162 and 176 by means of hinges 172, 174 and 188, 190, respectively. In the preferred embodiment, each of the hinges 172, 174, 188 and 190 comprise a section of the straps 158 and 160 which has been creased or otherwise weakened along three lines such as 192, 194 and 196 which meet at a point 198 along three lines such as 192, 194 and 196 which meet at a point 198 along the upper edge 200 of each of the straps. In the undeformed state of the strap, the U-shaped portions 170 and 186 extend at an angle from the first U-shaped portions 162 and 166 and their leading portions 202 and 204 engage the vertical post and draw it into abutment with the frame assembly 136. As best illustrated in FIGS. 9 and 10, if the second U-shaped portions of the retaining straps 158 and 160 are pulled downwardly to the dotted line position, the creased or weakened sections of straps 158 and 160, i.e., hinges 172, 174, 188 and 190 will bow outwardly (see FIG. 9) and there will be suffient clearance 206 between the leading portions 202 and 204 and post 152 to permit it to slide within-U-shaped portions 170 and 186. In this manner, easy attachment or removal of the barricade structure 134 from the base and frame assembly 132, 136 may be achieved.

By making the base of a highly visible, permanently colored plastic material instead of sawn natural logs or other wood products, a two-fold advantage results: the need for periodic painting is eliminated and the consumption of large quantities of wood is reduced thereby providing a beneficial ecological effect.

It should be noted that various modifications of the preferred embodiments illustrated could be made without departing from the scope of the invention. The base members could be made by any number of processes such as vacuum forming, pressure forming, etc., and the frame assembly could be made of the same material as the base thereby permitting it to be formed integrally therewith in a single operation. Also, the retaining straps of the embodiment illustrated in FIGS. 7 through 11 could be made integral with the frame assembly or with the frame assembly and base member.

The frame members could be made of polyethylene, polystyrene, wood, scrap lumber found on the construction site, etc. Typical dimensions for the base member are 12 inches by 12 inches by 8 feet.

While this invention has been described as having a preferred design, it will be understood that it is capable of further modification. This application is, therefore, intended to cover any variations, uses, or adaptations of the invention following the general principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and as may be applied to the essential features hereinbefore set forth and fall within the scope of this invention or the limits of the appended claims.

What is claimed is:

1. A portable barrier for use on roadways or the like comprising:
   a. an elongated, substantially rigid base of light weight material,
   b. said base being hollow to provide a liquid reservoir therein,
   c. said base having a flat bottom surface and a front surface extending substantially the length thereof,
   d. said base including opening means for permitting said reservoir to be filled and drained while said base is supported in a horizontal position,
   e. cap means cooperating with said opening means for sealing said reservoir,
   f. a barricade superstructure, and
   g. means for detachably clamping said superstructure to said base such that a portion of said superstructure rigidly abuts said front surface and said superstructure extends generally upwardly relative to said base.

2. A barrier as in claim 1 and wherein:
   a. said clamping means includes frame means at least partially encircling said base.

3. A barrier as in claim 2 and wherein:
   a. said base includes a recess, and
   b. a portion of said frame means is disposed in said recess.

4. A barrier as in claim 1 and wherein:
   a. said base is an elongated rectangular parallelepiped, and
   b. said clamping means includes frame means at least partially encircling said base in a lateral direction.

5. A barrier as in claim 4 and wherein:
   a. said frame means comprises a plurality of cooperating members positioned adjacent the lateral sides of said base and means for fastening said members together to form a unitary assembly.

6. A barrier as in claim 5 and wherein:
   a. said base has a recess therein, and
   b. at least one of said members is positioned in said recess.

7. A barrier as in claim 5 and wherein:
a. said means for fastening said members together includes bolts passing through said superstructure and said members.

8. A barrier as in claim 1, and wherein:
a. said clamping means includes strap means for encircling a portion of said barricade superstructure.

9. A barrier as in claim 1 and wherein:
a. said base is made of a plastic, and
b. at least a portion of said means for securing a barricade structure to said base is integrally formed with said base.

10. A barrier as in claim 1 and including:
a. handle means on said base member for permitting said barrier to be easily carried.

11. A barrier as in claim 1 and wherein said cap means includes at least one removable cap recessed in said base to lie flush therewith.

12. A barrier as in claim 11 and wherein said cap is positioned in a recess of sufficiently small size to prevent hand removal thereof.

13. A barrier as in claim 1 and wherein said cap means includes:
a. first and second removable caps, and
b. a flexible line connected between said caps.

14. A barrier as in claim 13 and wherein said line is attached to said caps by means of swivels.

15. A portable barrier for use on roadways or the like comprising:
a. an elongated, substantially rigid base of light weight material,
b. said base being hollow to provide a liquid reservoir therein,
c. said base having a flat bottom surface and a front surface extending substantially the length thereof,
d. said base including opening means for permitting said reservoir to be filled and drained while said base is supported in a horizontal position,
e. said base including a rear surface opposite said front surface,
f. cap means cooperating with said opening means for sealing said reservoir,
g. a barricade superstructure,
h. a frame member, and
i. means for detachably clamping said base between said frame member and said superstructure such that a portion of said superstructure abuts said front surface, said frame member abuts said rear surface and said superstructure extends generally upwardly relative to said base.

16. A portable barrier for use on roadways or the like comprising:
a. a substantially rigid base having a liquid reservoir therein,
b. means for permitting liquid to be introduced into and evacuated from said reservoir,
c. cap means for sealing said reservoir,
d. a barricade superstructure including a vertical post, and
e. means for securing said superstructure to said base including strap means fastened to said base and partially encircling said post,
f. said strap means including a flexible hinge and a portion movable about said hinge between first and second positions in and out of engagement, respectively, with said post.

* * * * *