June 3, 1969 J. W. BOWERSOX 3,447,429

POP-UP TRAFFIC SENTINAL

Filed April 24, 1967 Sheet 1 of 2

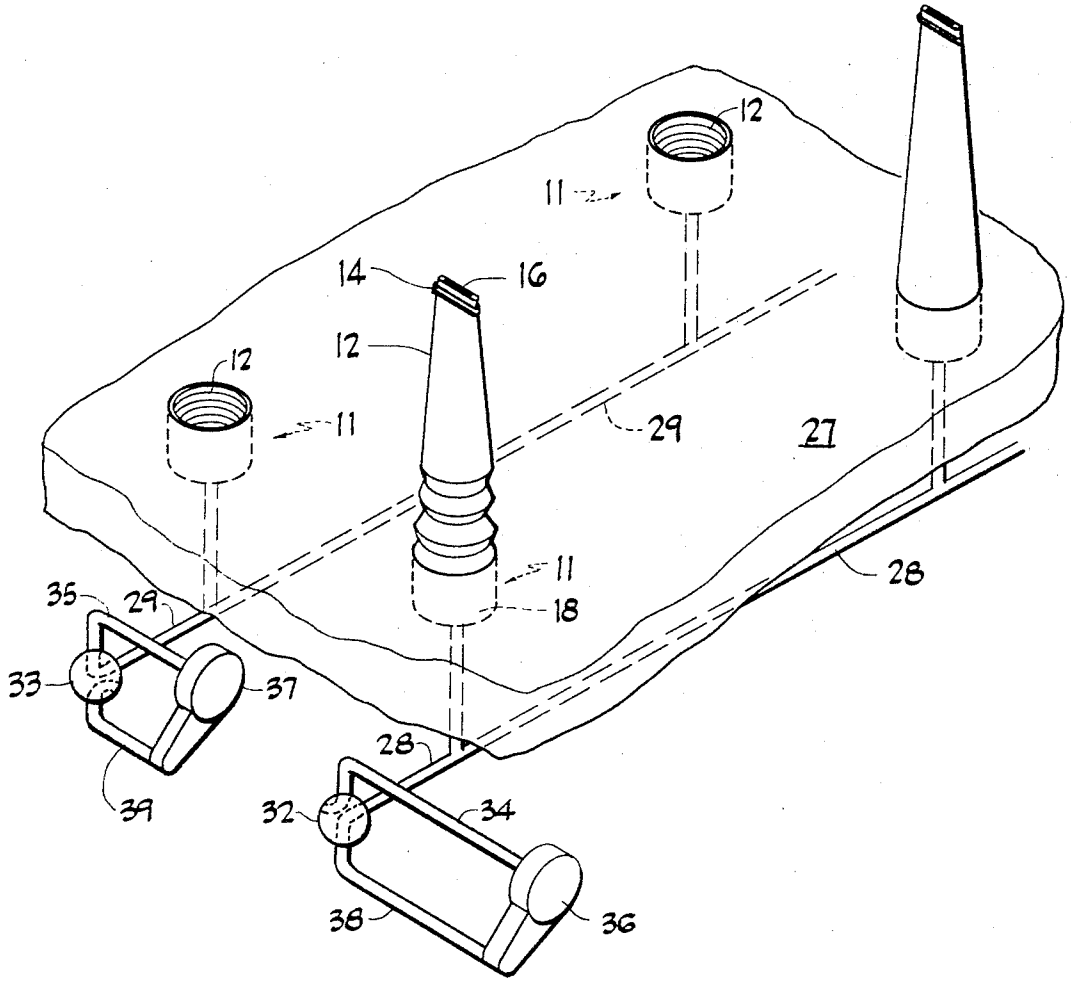


FIG. 1

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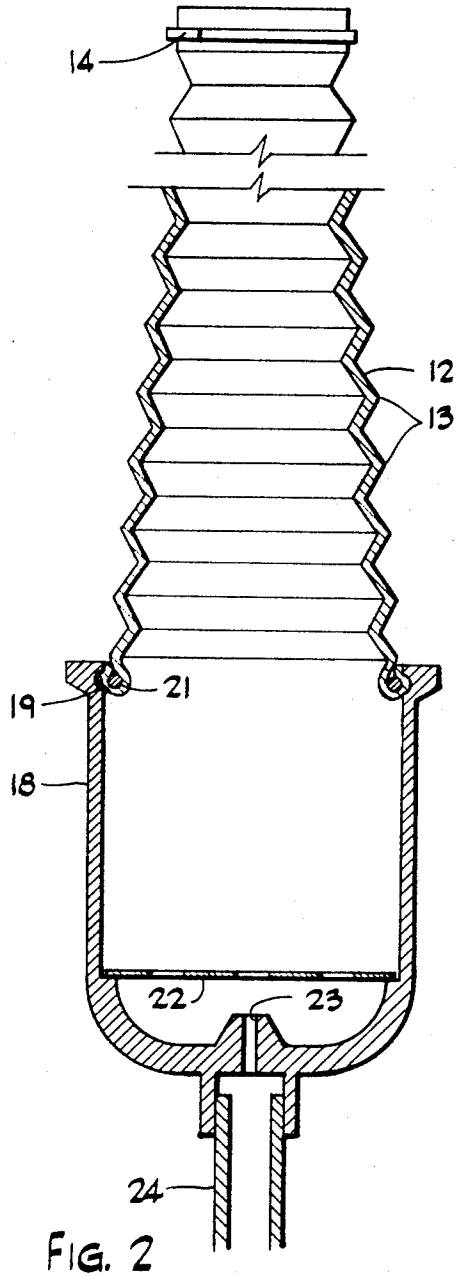


FIG. 2

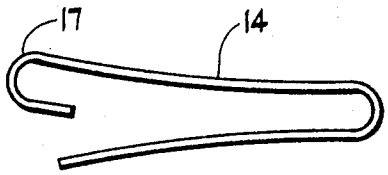


FIG. 4

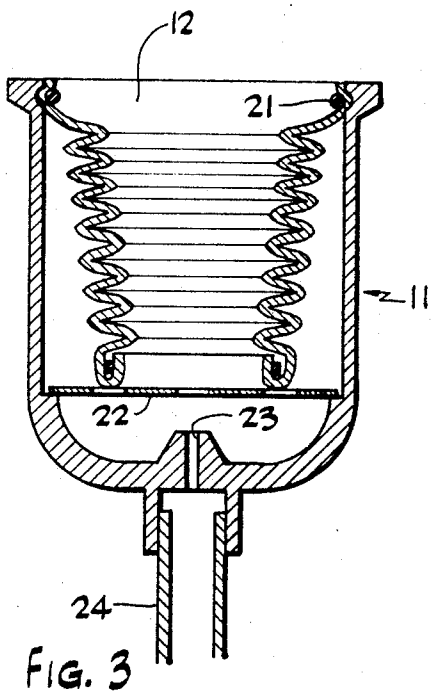


FIG. 3

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POP-UP TRAFFIC SENTINAL

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U.S. Cl. 94—1.5 8 Claims

ABSTRACT OF THE DISCLOSURE

Traffic cones are provided with flexible walled ring corrugations so that the cones will collapse or extend when the air pressure inside thereof is either negative or positive, respectfully. Each of such cones is provided with a receptacle within which it can collapse, and several of such receptacles are located below and flush with the surface of a roadway, and are connected at spaced apart locations to a common air conduit having reversibly connected thereto an air pump.

Background of the invention

In the prior art there are many devices for the control of traffic embodying the moving of continuous barrier strips between depressed and elevated positions with respect to a highway surface, and the moving of individual markers between such positions. However, such devices have been actuated by various types of jacks and controls therefor that constitute expensive and complicated mechanisms. Further, such prior art systems have been easily damaged by parts thereof being contacted by highway vehicles and by severe weather conditions.

Thus it is an object of the present invention to construct a marker as well as a system for actuating a plurality of such markers to move them between depressed and elevated positions with respect to a highway surface, that are simple in construction and operation, that are relatively inexpensive to install and maintain, and that are not easily damaged by weather conditions or by contact with vehicular traffic.

Summary of the invention

The above mentioned defects of the prior art traffic control devices are remedied and the above objects achieved by: First, constructing a traffic control cone, or marker, so that the sides of the cone are corrugated annularly to, in effect, shape the cone as a bellows that is thin walled and flexible enough that reducing the pressure inside thereof slightly below atmospheric will cause the cone to collapse downward and to extend upward when the interior pressure is slightly above atmospheric. Second, by sinking a cup in the pavement of a highway with the rim of the cup flush with the surface of such pavement and securing the bottom edge of the cone inside of the cup adjacent the rim thereof. Third, so setting a plurality of such cups and cones in a pavement in desired locations and connecting them to an air conduit having in communication therewith an air pump that upon proper operation will provide the desired air pressure in each of the cones of the plurality connected thereto. And, fourth, the provision of a valve structure at the upper end of each cone so that if a cone is struck by a vehicle or other object, the air in such struck cone will easily and rapidly escape therefrom to reduce the possibility of damage thereto.

Brief description of the drawings

An embodiment of the invention as outlined above is hereinafter described with more details important to the invention and is illustrated in the accompanying drawings, in which:

FIGURE 1 is a schematic isometric showing of portions of a traffic control system embodying the features of the present invention.

FIGURE 2 is a diametrical sectional elevational view of one of the individual pop-up cones and its receptacle as shown in FIGURE 1, but enlarged therefrom, and with the cone expanded.

FIGURE 3 is similar to FIGURE 2 but with the cone retracted into its base cup.

FIGURE 4 is an isometric view of the spring in the cone's upper end valve.

Description of the preferred embodiment

One of the pop-up units will be described in detail before describing the relating features of a plurality of such units as illustrated in the schematic perspective of FIGURE 1.

FIGURES 2 and 3 are diametrical sectional elevational views of a unit **11** with the views differing in that FIGURE 2 shows the cone **12** of the unit in its extended position and FIGURE 3 shows the cone **12** in its retracted position. Each of the cones is tapered from bottom to top end and is formed between its ends by a continuous series of annular corrugations, or rings **13**, with each ring being smaller in diameter than the one below to give the cone a bellows like construction. The purpose of tapering the cone is to increase its rigidity when extended and facilitate its retraction, or collapse and the smaller rings to pass thru the larger rings to the position of the cone in FIGURE 3. Further, the bellows construction resists the tendency of the sides to move radially inward when the air pressure is reduced inside of the cone.

The cone adjacent its upper end has two opposite sides thereof squeezed together by a flat spring clamp **14** so that there is between the legs of the clamp and the inner sides of the cone a slit **16**. FIGURE 4 is a perspective illustration of the clamp in its open and relaxed condition. It is made of a thin strip of spring steel bent medially thereof so that the halves are in opposition but curved outwardly from each other. This outward curve of the legs gives relatively uniform loading along the legs when they are brought together. One of the ends is formed with an inwardly turned hook **17** inside of which the other end is retained to hold the legs together and to clamp the end of the cone shut to form the slit **16** that has a length of about half the perimeter of the upper end of the cone. Once in place, the clamp is held in place by imbedding it in the material forming the cone or by cementing it to the cone. The spring tension closing the slit is such that the slit will open and the legs of the clamp will bow outwardly when the air pressure inside of the cone exceeds a predetermined value, a value slightly above that needed to hold the cone in its extended position. Particularly, it is intended that the clamp and contiguous portions of the cone act as a relief valve so that when the extended cone is struck by the wheel of a highway vehicle the air in the cone will be forced thru the valve to reduce the chance of the cone being ruptured by such wheel contact therewith.

The lower and large end of the cone is secured to a rigid metallic cup **18** just inside of the lip thereof. The inside diameter of the cup adjacent its lip is substantially the outside diameter of the cone at its lower end so that such end will fit in and conform to the inside of the cup at its lip, Adjacent the lip the cup is formed interiorly with an annular groove **19**. When the cone is collapsed into the cup as shown in FIGURE 3, with the edge of the cone above the cup rim, an expansion ring **21**, a snap ring, is placed against the outside of the cone in opposition to the groove **19** to force the opposed portions of the cone into the groove **19** and to retain such portions there and the rest of the cone with respect thereto

whether in the collapsed or extended position. A perforated plate **22** is seated adjacent to but spaced from the bottom of the cup and an air opening **23** to prevent the cone from contracting and sealing off the air supply and exhaust opening **23** formed in the bottom of the cup. This air opening **23** is in communication with a stand pipe **24** leading to an air main, or conduit. The air opening **23** is small to prevent a rush of air, air hammer, from rupturing the cone and to minimize loss of air from the supply system if the cone is ruptured or destroyed. This allows continued operation of a system having many units connected thereto even if some of the cones of the units are ruptured.

It is intended that each of the cups **18** be set into the pavement **27** of a highway or street with the edge of its rim flush with the surface of the pavement. The inside diameter of the cup is about three inches so that if a vehicle wheel passes over the cup there is practically no shock to such wheel.

The schematic isometric illustration of FIGURE 1 shows a section of pavement **27** that has so set therein two lines of such pop-up units **11**, each unit with its cup rim flush with the top surface of the pavement. One line of such units has each of its units connected to and in communication by means of its stand pipe **24** with an air main **28**, and the units of the other line are similarly connected to another air main **29**. Each of these lines of units may be referred to by the number of its air main. The cones of the units in the line **28** are shown in extended position and the units of the line **29** are shown in their retracted condition. The illustration is of only two units of those in each line. The number connected in a line may be any desired amount. The air supply and the size of the air mains will be according to the number of units and line losses.

The outer end of each air main has not been shown but it will be closed. The inner end of each main is connected to and in communication with a three-way valve **32**, **33**. Each of the valves **32**, **33** has a connection to the suction side **34**, **35**, the low side, of an air pump **36**, **37** individual to each valve, and a connection to the pressure side **38**, **39**, the high side, of the pump individual to a such valve. Operation of a valve selectively puts the related main in communication with either the high side or the low side of the related pump and the side of the pump not in communication with the main in communication with the atmosphere. Thus, with the pumps operating, either main may be selectively under either a negative or a positive pressure with respect to the atmospheric pressure, and, so, the cones of a line will be either retracted into their cups or extended therefrom, respectively. In the showing of FIGURE 1, the cones of line **28** are extended and the valve **32** is set so that the high side of the pump **36** is in communication with the conduit **38**; and the cones of line **29** are retracted with the valve **33** set so that the low side of the pump **37** is in communication with the conduit **29**.

If sand or gravel falls into a cup when the cone is retracted, it will be ejected therefrom when the cone is again extended from its cup.

A line of cones may be used as traffic diverters to shift traffic from one lane to another, and such lines may be angled from right to left, or two lines angled to each other in the same lane may be used selectively to, at different times, divert traffic in different directions. One line of parallel lines of cones between traffic lanes may be used to mark the division between on-coming traffic, the marking line being the only line having its cones extended, and the marking line being selective between the parallel lines of cones. Closely spaced cones in a line across and normal to a traffic lane may be used as barriers to give emergency vehicles a right-of-way or to create a pedestrian cross-walk.

Having thus described my invention, its construction, operation, and some of its uses, I claim:

1. A pop-up highway marker, comprising: a thin elastic walled flexible tubular member open at one end and closed at the other, said member being flexible enough so that a small negative air pressure below atmospheric pressure inside of said member will cause it to collapse axially thereof and to turn outside in and said member being flexible enough so that a small air pressure above atmospheric inside of said member will cause said member, when collapsed, to turn inside out and to extend axially thereof, said member, when so extended, being extended above the surface of a highway to be marked by such marker, and said extension above such highway surface being the above highway visible portion of the marker.

2. The combination of claim **1** including a valve closing said closed end of said member.

3. The combination of claim **1** in which the walls of said member are corrugated annularly.

4. In combination with the member of claim **1**, a cup, means securing said member and said cup coaxially together with the portions of the member adjacent the open end thereof sealed to said cup interjacent its lip, and said cup being formed with an air passageway thru a wall thereof; said member, cup, and securing means constituting a marker unit.

5. The combination of claim **4** in which the walls of said member are corrugated annularly.

6. The combination of a plurality of such units as set forth in claim **4** arranged in a desired spaced relationship to each other, an air conduit, means specific to each of said units connecting a such unit to said conduit and establishing communication with said conduit and said air passageway of a such unit, and an air pump in communication with said conduit and adapted to establish an air pressure therein other than atmospheric pressure.

7. The combination of claim **6** in which the walls of said member are corrugated annularly.

8. The combination of claim **6** including a section of highway pavement and the lips of such cups being flush with the surface of such pavement.

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