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Burnstine

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[54] **AIDS FOR THE VISUALLY HANDICAPPED**

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[52] **U.S. Cl.** **135/47;** 135/61

[51] **Int. Cl.²** **A45B 3/00;** A45B 9/04

[58] **Field of Search** ..... 135/47, 47.5, 49–64; 9/310 D

[56] **References Cited**

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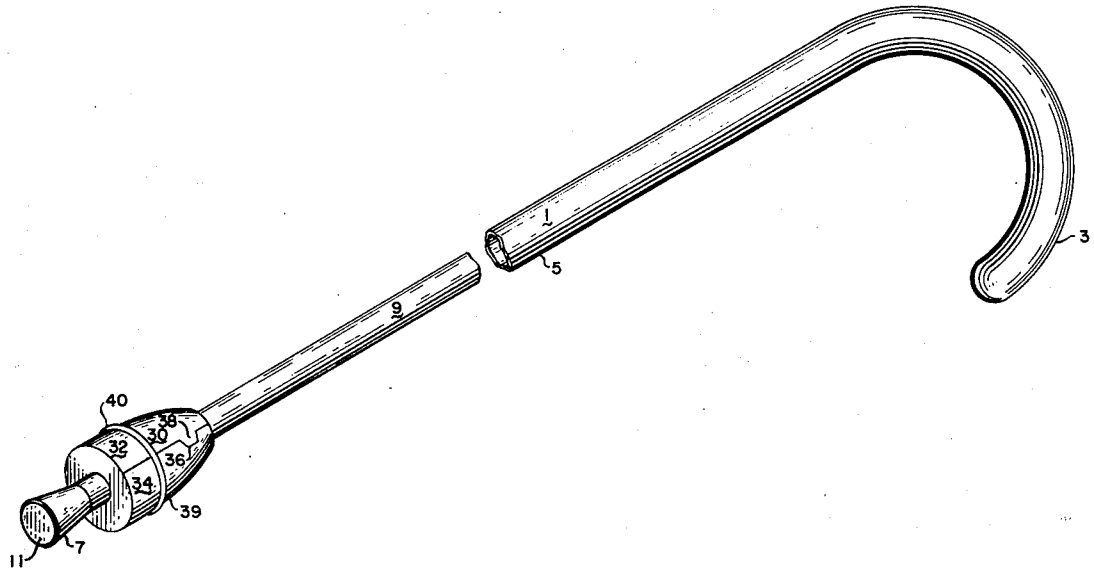
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[57] **ABSTRACT**

There is disclosed an aid for the visually handicapped which provides the user with the ability to sense standing bodies of water or other liquids.

8 Claims, 4 Drawing Figures



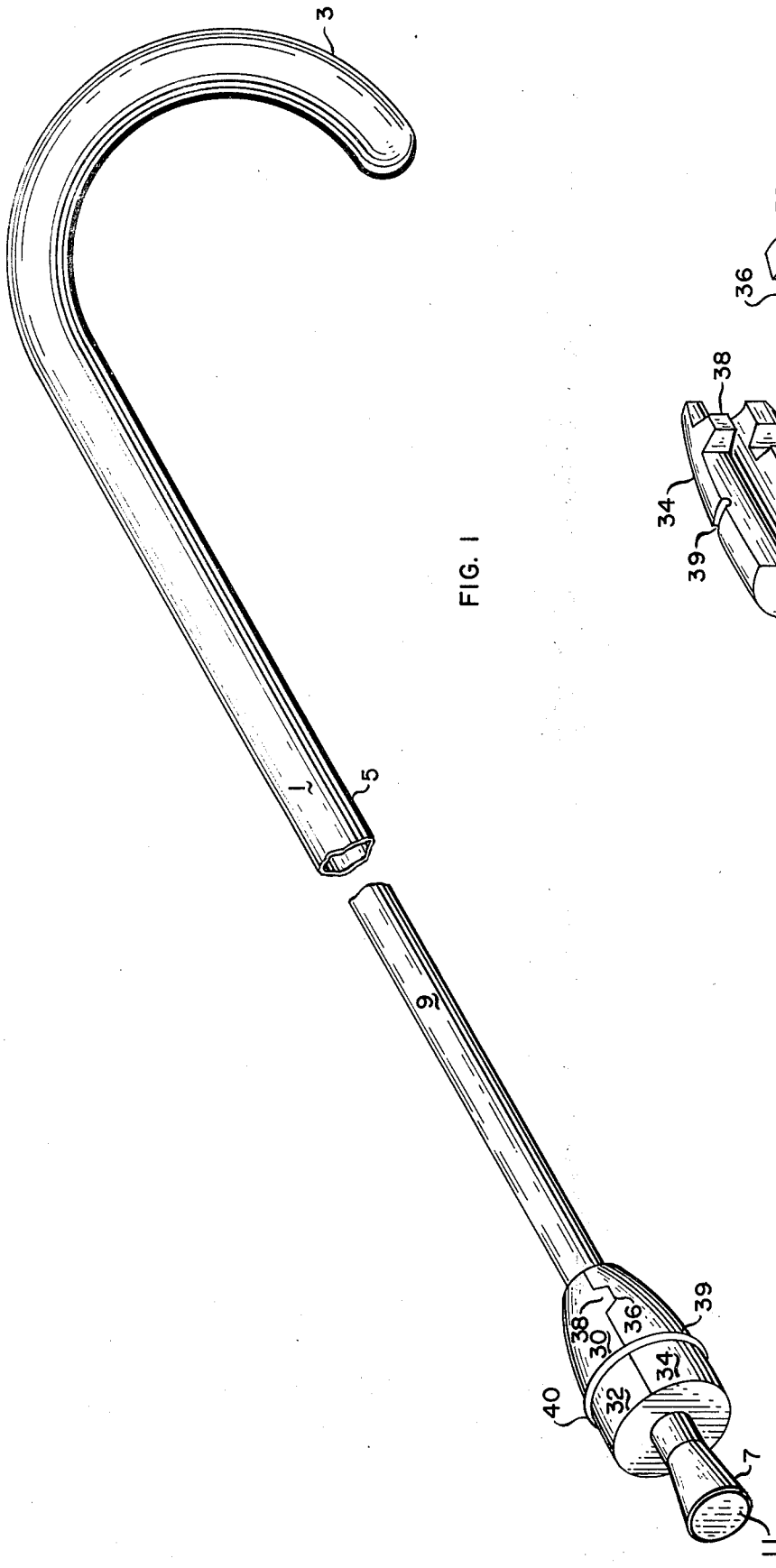


FIG. 1

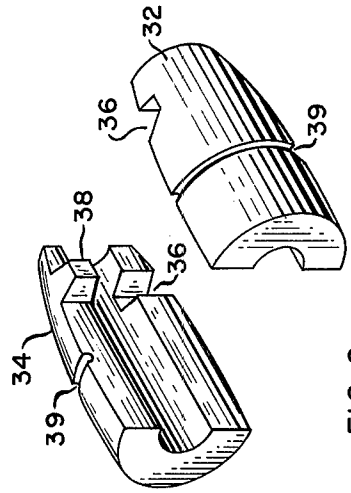


FIG. 2

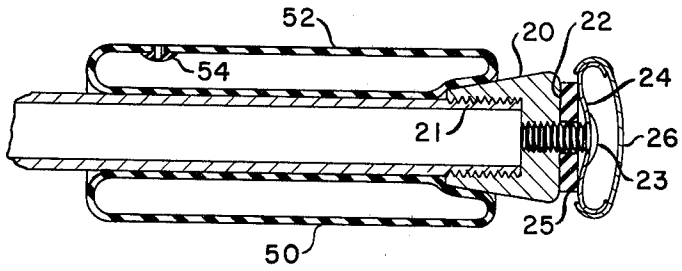


FIG. 3

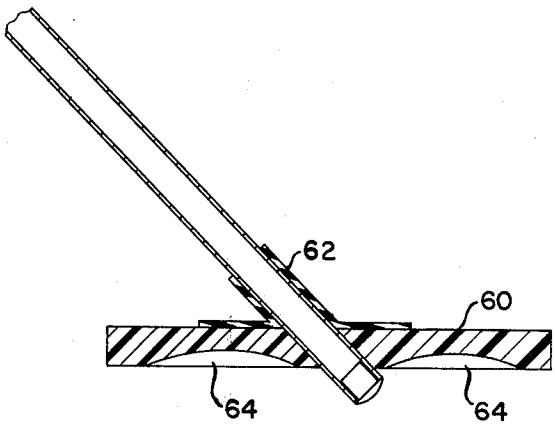


FIG. 4

AIDS FOR THE VISUALLY HANDICAPPED

FIELD OF THE INVENTION

The present invention relates generally to aids for the visually handicapped and more specifically is associated with devices for cane means with which the visually handicapped scan their environment.

One of the problems which has heretofore plagued those visually handicapped who employ cane means as an environmental sensing or scanning device resides in the general inability of prior art cane means to effectively signal the user of the presence of standing bodies of water or other liquids. Accordingly, the blind cane user normally finds himself in an uncertain and hazardous environment when walking in rain or any location where puddles and the like are encountered.

Generally, the tip of the cane penetrates a standing body of water with insufficient transmission of the tactile stimulus to warn the user of the presence of the standing water. In exceedingly quiet environments the cane tip can sometimes produce an auditory signal of sufficient strength to provide such warning; however, this auditory stimulus is highly dependent upon the particular manner in which the user scans with the cane and, in any case, requires a level of quietude which is rarely, if ever, achieved during rain storms or within urban areas where normal traffic noise levels tend to be significant. Thus, using prior art cane devices, the visually handicapped individual is often subject to the danger, discomfiture and considerable embarrassment involved in walking into unsensed bodies of standing water. In accordance with the present invention, however, this problem has been greatly alleviated.

OBJECTS OF THE INVENTION

It is a principal object of the invention to provide a novel sensing device adapted for use with canes which device is characterized by its ability to provide perceptible tactile (or proprioceptive) stimuli to a blind user thereof so as to empower said user to avoid standing bodies of water or other liquids.

It is another object of the invention to provide a novel liquid sensing device for use in combination with canes which device is characterized by facile assembly and disassembly by a blind user thereof.

It is still another object of the present invention to provide improved cane apparatus for use by the visually handicapped.

Other objects and advantages of the present invention will in part be obvious and will in part appear hereinafter.

GENERAL DESCRIPTION OF THE INVENTION

The above and other objects and advantages are provided by a device comprising a buoyant member adapted for attachment to the terminal portion of a cane and having sufficient buoyancy to create a perceptible tactile stimulus upon contact thereof with the surface of a body of liquid.

THE DRAWINGS

FIG. 1 is a perspective schematic partly sectioned view of a cane equipped with a preferred embodiment of the buoyant sensing devices of the invention.

FIG. 2 is a perspective view of the disassembled sensing device of FIG. 1.

FIG. 3 is a longitudinal sectional view of another embodiment of the buoyant sensing devices of the invention.

FIG. 4 is a longitudinal sectional view of still another embodiment of the buoyant sensing devices of the invention.

Referring to FIGS. 1 and 2 wherein like reference numerals refer to like features, cane 1 generically comprises a handle portion 3, shaft 5 and tip 7. Terminal portion 9 of cane shaft 5 is generally defined as that portion of the shaft/tip structure within about 6 inches of terminus 11 and it is to said terminal portion 9 to which the buoyant sensing device of the invention is affixed. Preferably, the attachment of the buoyant sensing device to terminal portion 9 is effected in such a manner that the tipmost portion thereof is within about 3 inches of said terminus 11.

As will be recognized by those cognizant of the design and manufacture of canes for the visually handicapped, considerable variation may be encountered in the materials of construction and design specifics of cane 1. For instance, conventionally employed materials of construction include hard woods; metals and alloys of metals such as steel, magnesium, aluminum, titanium; glass reinforced polyester resins and, of substantial recent research interest, more esoteric composite materials such as carbon or boron fiber reinforced epoxy resins.

Likewise, canes are or have been available to the visually handicapped wherein handle 3 is straight rather than curved as specifically shown in FIG. 1. Also, folding or telescoping canes having a plurality of shaft sections and means for locking said sections into firm alignment with one another are known. Finally, tip 7 (including terminus 11) is conventionally constructed of hard wood, metal or a hard polymeric material such as a polyamide resin in order to optimally transmit tactile stimuli through shaft 5 and into the hand of the user while concomitantly providing good wear properties. Recently, the so-called "glide tip ferrule" design has found favor, particularly in the fabrication of tubular metal canes. Basically, as depicted in longitudinal section in FIG. 3, said glide tip ferrule comprises a flared ferrule 20, the rearward portion of which is counterbored and internally threaded to receive externally threaded tip 21 of the cane shaft. The center of face 22 of ferrule 20 is drilled and threaded to receive threaded stud or machine screw 23. Stud 23, in turn, is employed to fasten spring clip 24 to face 22. Preferably, a resilient elastomeric ring 25 is sandwiched between said face 22 and spring clip 24. The function of clip 24 is to fasten tip button 26 to the remainder of the assembly in a secure, yet readily replaceable manner.

Thus, the particular choice of cane to be employed in consort with the buoyant sensing device of the invention is not normally critical. In a preferred combination of cane and buoyant sensing device, however, the cane is of tubular metallic construction and has an overall length of at least 40 inches. Canes meeting this length criterion are clearly distinguished from canes designed primarily for weight support and the Veterans' Administration has coined the term, "typhlocane" (typhlo, Gr., long) to describe them.

The buoyant sensing device of the invention, referring again to FIGS. 1 and 2, is composed of a buoyant structure 30 adapted for fixation to the terminal portion 9 of shaft 5. The necessary buoyancy may be

achieved primarily through suitable choice of a buoyant material of construction or by the design of the structure. As an example of the former expedient buoyant structure **30** comprises two longitudinally mated flotation members **32** and **34** which together form a cored and preferably bell-shaped structure. Said members are composed of a buoyant material such as cork, balsa wood or, preferably, a closed-cell polymeric foam such as styrofoam or urethane foam. Due to their generally light weight, buoyancy, and overall toughness, closed-cell rigid or semi-rigid polyurethane foams represent a particularly well-suited material of construction for flotation members **32** and **34.** Axial alignment of said members **32** and **34** is conveniently effected by the provision of keyways **36** and corresponding projections **38** in the parting surfaces of the members. The necessary compressive force required to affix members **32** and **34** to the terminal portion **9** of cane shaft **5** may be achieved by the provision of slot **39** circumscribing said members **32** and **34** and in which slot there resides a compression band or ceinture **40** which may be an "O" ring of a resilient elastomeric material. By virtue of the design of the above-described buoyant sensing device there is provided a simple sensing device which may be quickly assembled and affixed to the cane shaft by a blind person and which has the further advantage residing in the fact that a given size thereof is generally suitable for use with canes of substantial variation in their shaft diameters.

In FIG. **3** there is shown a sensing device in which buoyancy is provided by virtue of design rather than through the inherent buoyancy of the material of construction employed. Referring now to said FIG. **3,** buoyant sensing device **50** comprises a hollow torus as delimited by continuous wall **52.** Said wall **52** is constructed of a gas-impermeable material, such as thin metal shimstock. However, resilient abrasion-resistant polymeric or elastomeric materials such as polyethylene, polyurethane, butadiene-styrene rubber, butyl rubber, polyisoprene, etc., are preferred. When the much preferred resilient polymeric or elastomeric materials of construction are employed, the assembly of the toroidal buoyant sensing device **50** to the cane shaft may be simply achieved by "rolling" the torus over the cane tip and upwardly to its desired location on the terminal portion of the shaft. If desired, the toroidal device may also be equipped with valve **54** through which inflation thereof may be effected.

In FIG. **4** there is provided a buoyant sensing device of a type adapted to complement the tactile stimuli provided by the buoyant device with acoustic stimuli. Said device comprises a rigid buoyant planar structure **60** affixed to the cane shaft so as to rest in a substantially horizontal plane when the cane shaft is held at its normal scanning angle. Fixation of the structure **60** to the shaft is effectuated by elastomeric collar **62.** Acoustic stimuli are produced by depressions **64** formed in the bottom surface of buoyant planar structure **60.** In scanning the environment, a downward movement of structure **60** into contact with a standing body of liquid will produce a tactile stimulus through the buoyant effect while acoustic stimuli will be elicited through the action of depressions **64** impacting the liquid surface.

General considerations to be borne in mind in the design and fabrication of the buoyant sensing device of the invention reside in the parameters of (**1**) weight, (**2**) size, and (**3**) buoyancy. In order that the device not substantially derogate the overall sensitivity of the cane, it is important that it weigh no more than about **4** ounces and have no major dimension (length, width, diameter, thickness) greater than about **4** inches. Preferably, the device will weigh less than about **1** ½ ounces and have no major dimension greater than **3** inches. Finally, the minimum buoyancy required of the device is subject to wide variation depending upon such singular factors as: the tactile sensitivity of the user; the weight, length, geometry and balance of the particular cane employed; the specific manner in which the cane is scanned; the angle at which the cane is held, etc. It is sufficient to say, therefore, that the buoyancy of the sensing device should be sufficiently great so as to cause a threshold stimulus perceived by the user as a lightening of the cane shaft upon entry of the device into a puddle or similar body of liquid. Thus, it is pointed out that the buoyancy of the device need not be so great as to actually cause flotation of the cane tip on the surface of the encountered liquid.

What is claimed is:

1. An aid for the visually handicapped comprising buoyant means adapted for mounting on the terminal portion of a cane shaft, said buoyant means comprising: (A) two longitudinally mating halves defining together a form stable buoyant structure having a longitudinal bore therethrough, said bore being adapted to engage a cane shaft at the terminal portion thereof and said buoyant structure having sufficient buoyancy to convey a perceptible tactile stimulus through a cane shaft when brought into contact with a standing body of water, and (B) means to urge said mating halves of said buoyant structure together so as to bind said halves to the cane shaft.

2. The aid of claim **1** wherein said buoyant structure is composed of a form stable polymeric closed cell foam.

3. The aid of claim **1** wherein said means of (B) comprises, in combination, a circumferential groove disposed about the external surface of said mating halves, said groove being oriented in a substantially normal plane relative to the longitudinal axis of the bore; and a resilient ceinture adapted to nest in said groove.

4. The aid of claim **1** wherein the parting surfaces of said halves are keyed to one another.

5. The aid of claim **1** wherein said buoyant means is bell-shaped.

6. The aid of claim **1** having a weight of less than about **1** ½ ounces and each of whose major dimensions is no greater than about **3** inches.

7. In a cane for the visually handicapped the improvement which comprises a buoyant means affixed to the terminal portion of the cane shaft, said buoyant means comprising: (A) two longitudinally mating halves defining together a form stable buoyant structure having a longitudinal bore therethrough, said bore engaging said cane shaft and said buoyant structure having sufficient buoyancy to convey a perceptible tactile stimulus through said cane shaft when brought into contact with a standing body of water; and (B) means to urge said mating halves of said buoyant structure together so as to bind said halves to said cane shaft.

8. The cane of claim **7** wherein the tipmost portion of said buoyant means is located within about three inches of the terminus of the cane tip.

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