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United States Patent [19]
Krietzman

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[54] **LASER LIGHT**

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Related U.S. Application Data

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[51] **Int. Cl.**⁷ **F21K 7/00; F21L 7/00**

[52] **U.S. Cl.** **362/158; 362/259; 362/184; 362/205**

[58] **Field of Search** 362/158, 184, 362/205, 206, 259, 203

[56] **References Cited**

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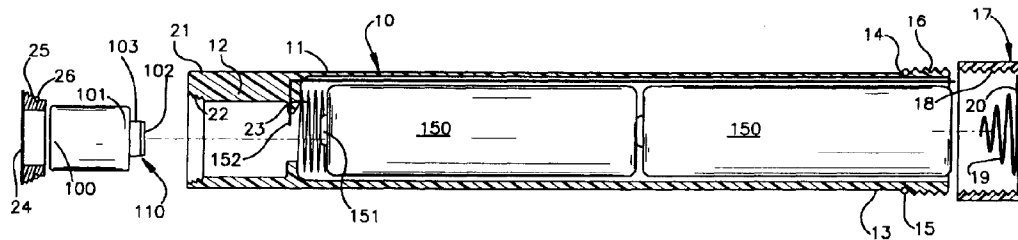
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[57] **ABSTRACT**

A novel hand held waterproof or submersible laser illumination device which provides for prolonged precise controlled illumination. The present invention also provides for a combination generalized illumination and selectable precise laser outputs.

29 Claims, 3 Drawing Sheets



Parhelion, Inc.
EXHIBIT
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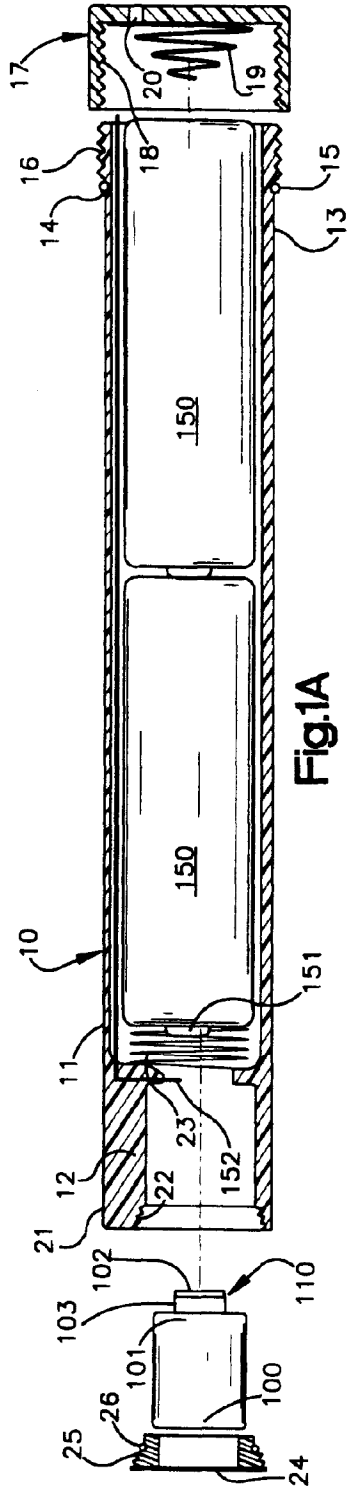


Fig.1A

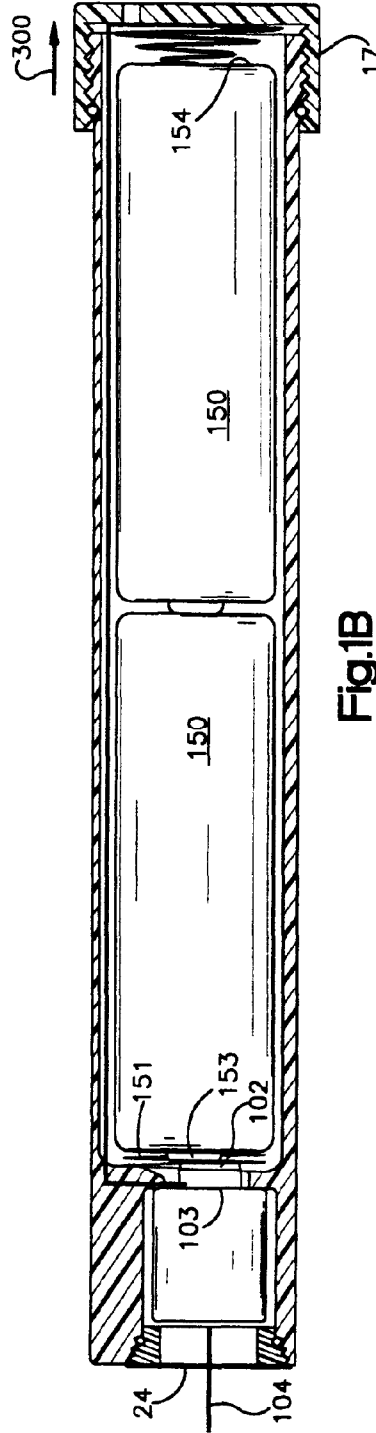
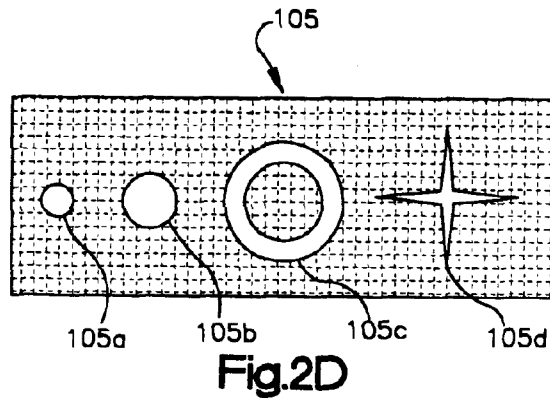
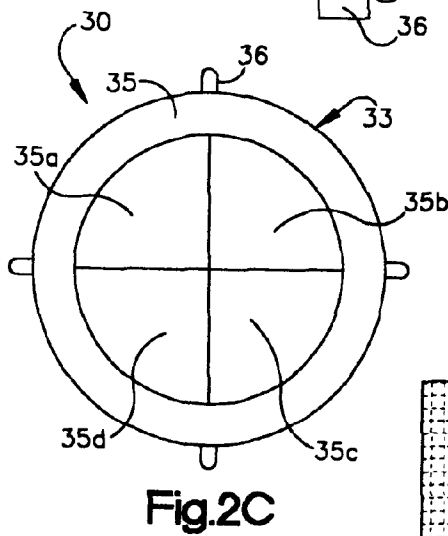
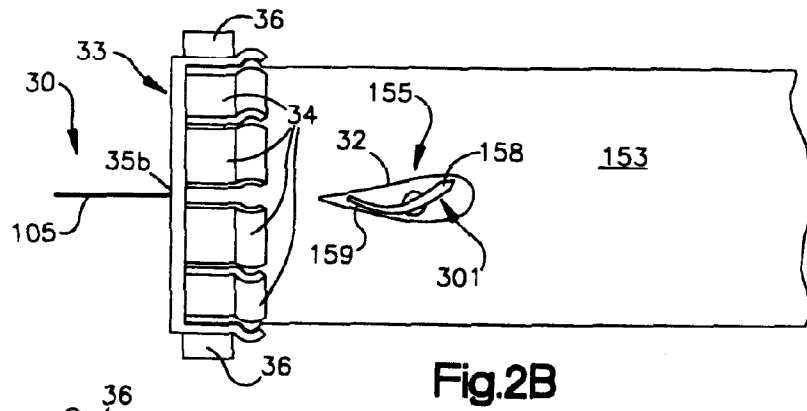
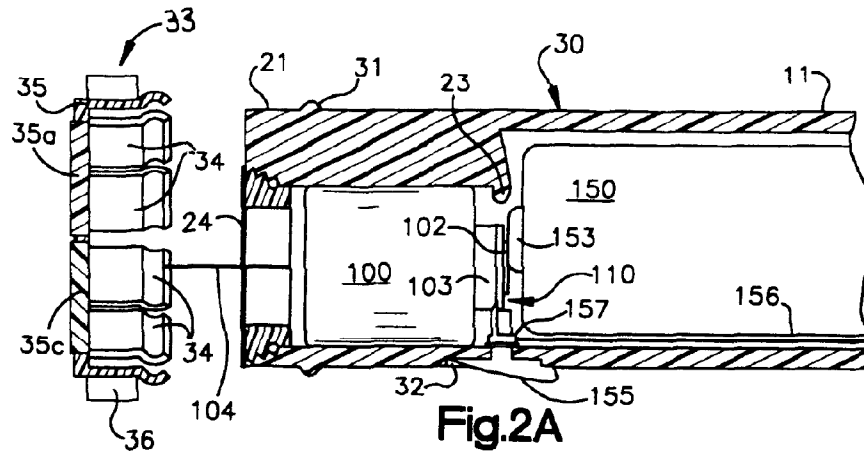
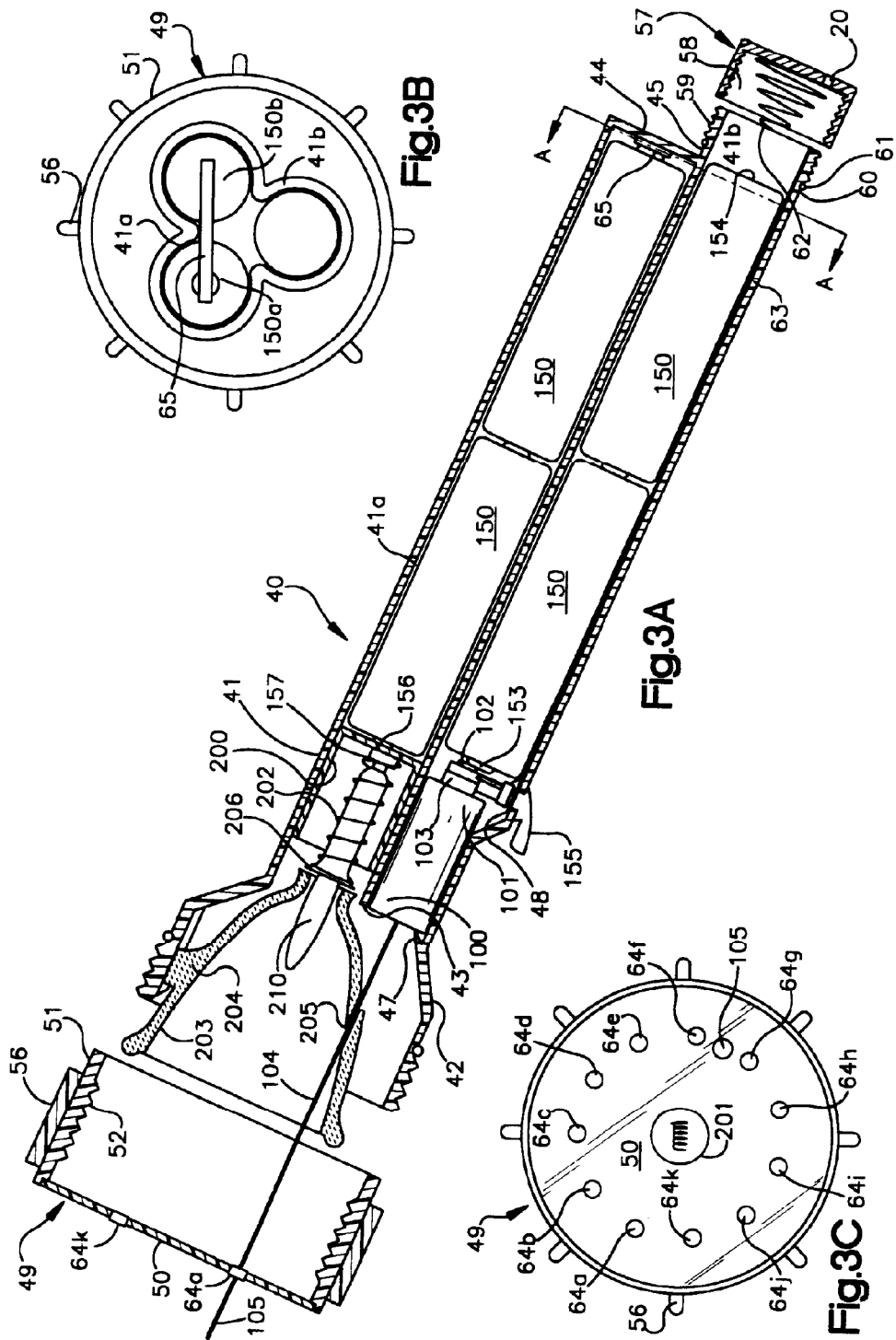


Fig.1B





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LASER LIGHT

RELATED APPLICATIONS

The within invention claims the benefit, under Title 35, United States Code 119 (c), of two Provisional Application: 60/043,192, filed Apr. 16, 1997.

BACKGROUND OF THE INVENTION

TECHNICAL FIELD OF THE INVENTION

This present invention relates to hand held lighting devices, and more particularly to a novel hand held waterproof or submersible laser light and laser flashlight, for illumination, communication, targeting, presentations, and measurement.

BACKGROUND

Those experienced with diving will recall that inexpensive underwater communication is normally a combination of writing tablets, hand signals and nods. Watertight flashlights may solve some problems but do not provide the precise highly visible illumination and communication a submersible laser emitting illuminator yields.

Watertight flashlights are useful to ensure the integrity and reliability of operation in wet and harsh environments. In the underwater environment the users ability to see clearly, communicate verbally, and dexterity are limited by the breathing equipment and the dampening effect of the water. Also, often in non-underwater environments verbal communication may be restricted or limited.

A submersible laser light is visible in day and night situations and enhances a divers ability to communicate. Providing selectable laser outputs further enhances clear communication and illumination.

In both diving and non-diving situations a flashlight which produces both a general area of illumination and a precise controlled laser illumination would be useful.

The present invention provides a novel illumination system for prolonged precise selectable laser communication and precise controlled laser illumination. The present invention also provides for a combination generalized illumination and precise laser illumination.

SUMMARY OF INVENTION

Accordingly, it is an object of the invention to provide a novel hand held laser light.

It is yet another object of the invention to provide a novel hand held submersible laser light.

It is yet another object of the invention to provide a novel hand held submersible laser illuminator which can transmit a narrow focused output, underwater, to activate a remote wavelength specific submersible photoactive sensor with audible output.

It is yet another object of the invention to provide a novel hand held submersible laser light with selectable diffuse output.

It is yet another object of the invention to provide a novel hand held submersible laser light with selectable pattern output.

It is yet another object of the invention to provide a novel hand held submersible flashlight and laser light.

It is yet another object of the invention to provide a novel hand held flashlight and laser light.

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It is yet another object of the invention to provide a novel hand held all weather flashlight and laser light.

It is yet another object of the invention to provide a novel hand held submersible flashlight and laser light with selectable diffuse laser output.

It is yet another object of the invention to provide a novel hand held submersible flashlight and laser light with selectable pattern laser output.

The features of the invention believed to be novel are set forth with particularity in the appended claims. The invention itself, however, both as to configuration, and method of operation, and the advantages thereof, may be best understood by reference to the following descriptions taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A illustrates a cut-away side assembly view of the preferred embodiment of the laser light.

FIG. 1B illustrates a cut-away side view of the preferred embodiment of the laser light.

FIG. 2A illustrates a partial, cut-away side assembly view of an alternate embodiment of the laser light with overlens.

FIG. 2B illustrates a partial, top view of the embodiment of FIG. 2A assembled.

FIG. 2C illustrates a front view of FIG. 2B.

FIG. 2D illustrates a front view of the selectable output of FIG. 2C.

FIG. 3A illustrates a partial, cut-away side assembly view of the preferred embodiment of a wide spectrum flashlight with laser light.

FIG. 3B illustrates a cut-away rear view of the embodiment of FIG. 3A, at line A—A.

FIG. 3C illustrates a front view of the embodiment of FIG. 3A.

MODES FOR CARRYING OUT THE INVENTION

Referring now to the drawings, there is illustrated in FIG. 1A a cut-away assembly side view of the preferred embodiment of the laser light generally designated 10.

The generally tubular housing 11 is of a size and shape which allows the insertion of one or more batteries 150, a removable solid state laser diode 100, (held in place within a circular diode guide 12 formed within the housing), and a front spacing spring 151 for controlling battery 150 contact with the laser emitting diode 100.

The batteries 150 are inserted into the rear of the housing 13. The outer wall of the rear of the housing 13 is circularly grooved 14 to secure a rubber or silicone O-ring 15 firmly in place and has circular coarse threads 16. An end cap 17 with internal threads 18 corresponding to the coarse threads 16 is screwed on to the housing 13 over the O-ring 15 to seal the device 10. The rear-cap 17 also contains a contact spring 19 for controlling battery 150 contact with the laser emitting diode 100 and a one-way pressure relief valve 20 to vent battery 150 gases.

At the front end of the housing 21, the diode guide 12 is internally threaded 22. The diode guide 12 abuts a diode stop 23 which is used to inhibit rearward movement of the laser emitting diode 100.

The laser emitting diode 100 is readily available and is known art. The diode comprises a laser beam module with a control circuit. Since the laser emitting diode is well

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