114-242. OR 3,469,551 SR

Sept. 30, 1969 R. L. LEFEBVRE 3,469,551

GEOPHYSICAL TOW BUOY

Filed March 11, 1968 2 Sheets-Sheet 1

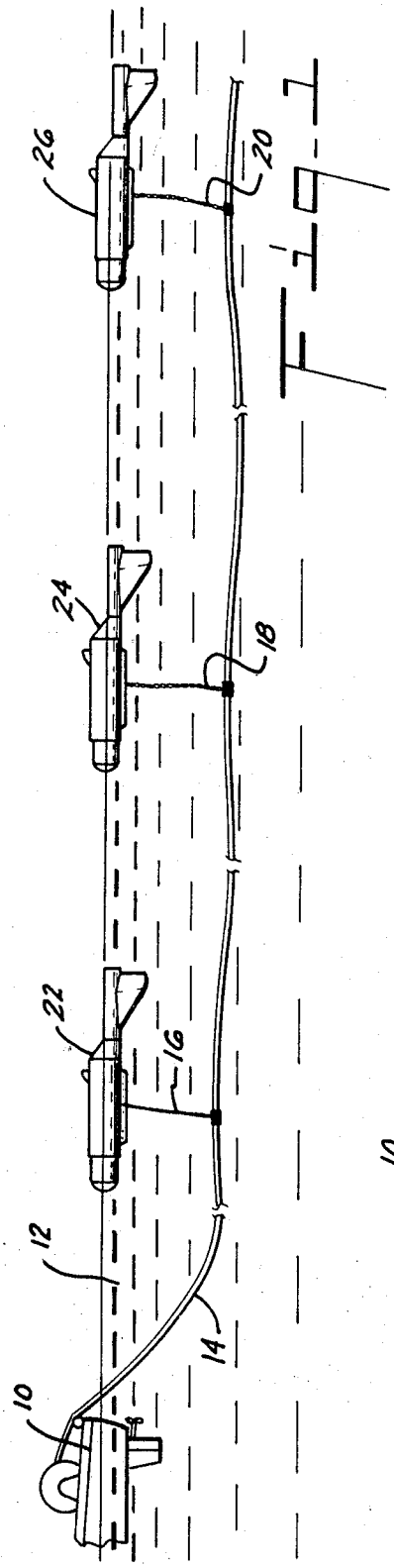


Fig. 1

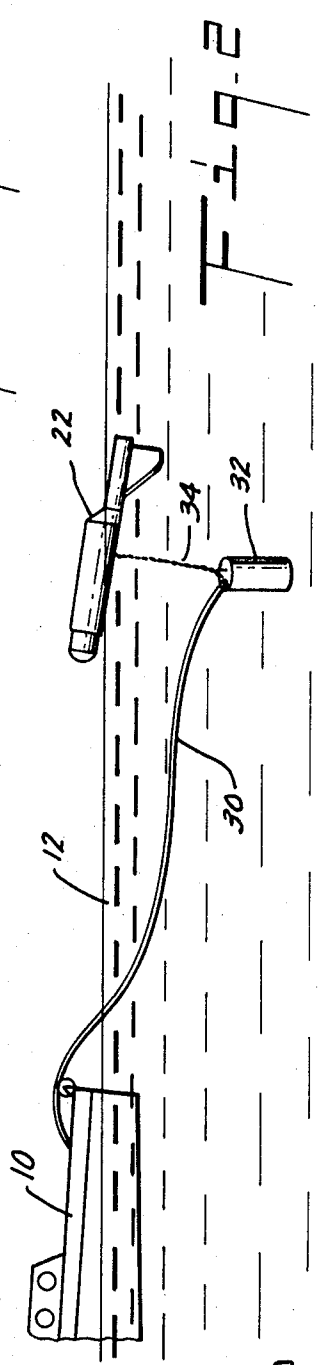


Fig. 2

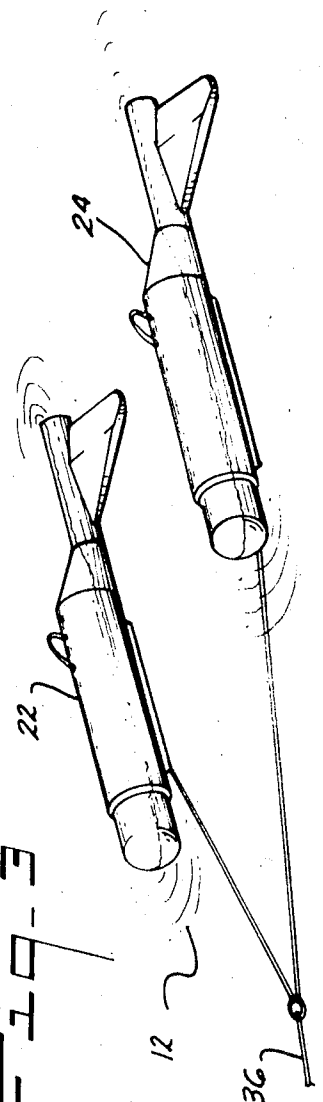


Fig. 3

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GEOPHYSICAL TOW BUOY

Filed March 11, 1968 2 Sheets-Sheet 2

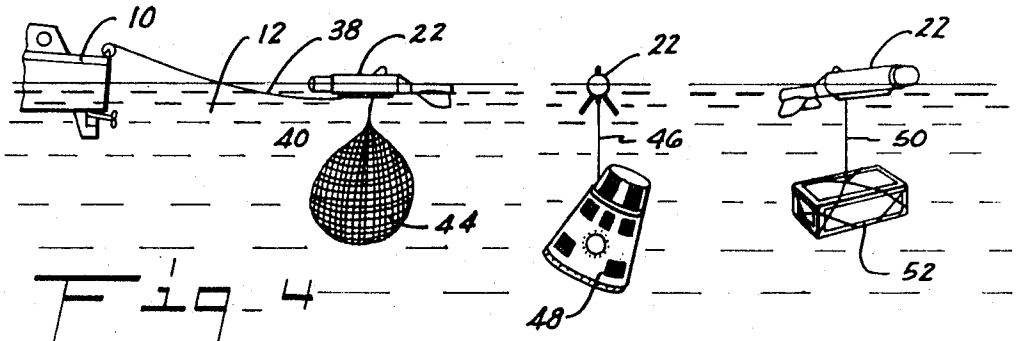


Fig. 4

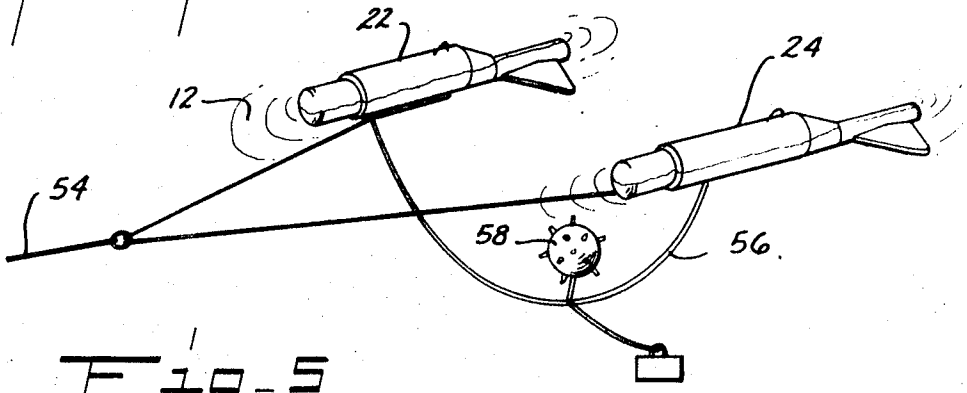


Fig. 5

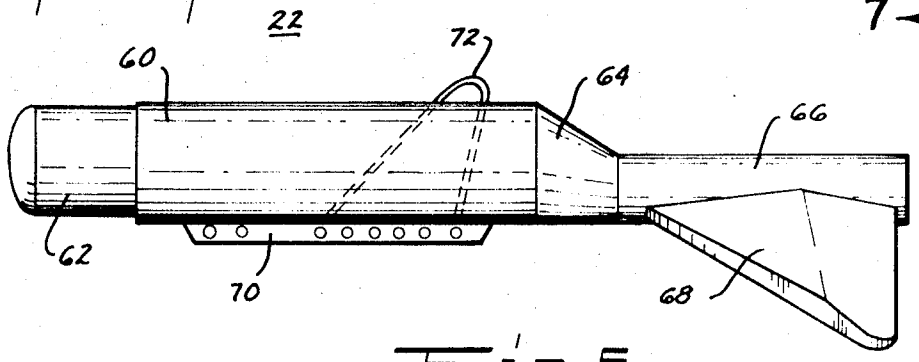


Fig. 6

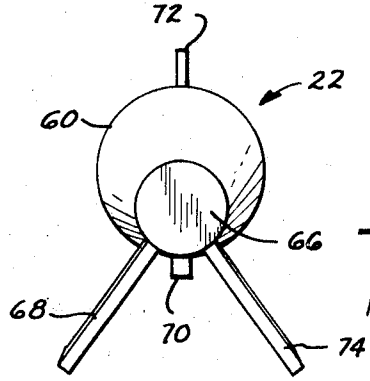


Fig. 7

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3,469,551

GEOPHYSICAL TOW BUOY

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Int. Cl. B63b 21/52
U.S. Cl. 114—235 1 Claim

ABSTRACT OF THE DISCLOSURE

A buoy characterized by its light weight and continued buoyancy even though the buoy may be damaged, such buoy having a lifting eye at substantially its center of gravity. A pair of fins are mounted on the aft portion of the buoy.

BACKGROUND OF THE INVENTION

Field of the invention.—This invention pertains generally to buoyant structures having particular adaptation in the field of geophysical prospecting although the field of use of the invention encompasses any activity which may take place in a body of water.

Description of the prior art.—In offshore oil and gas exploration activity including seismic surveying, it is necessary to have buoyant structures for positioning apparatus such as geophones.

Prior to the present invention, steel buoys nine feet in length and weighing approximately 450 pounds required four men to launch such steel buoys from a boat. Such steel buoys are capable of supporting about 700 pounds. Also, if such a steel buoy is damaged, the buoy will sink and thereby disrupt operations and cause a delay in the scheduled offshore activity. The present invention provides a buoy having a Fiberglas shell and weighs approximately 100 pounds. The buoy of the present invention requires only one man to launch it from a boat. Also the buoy of the present invention provides less electronic interference when compared with known steel buoys. The buoy of the present invention is easier to tow behind a vessel than steel buoys and may be repaired aboard a vessel without danger of sinking if the buoy of the present invention is damaged while in use in a body of water.

SUMMARY OF THE INVENTION

The present invention provides a buoy useful in offshore operations, such buoy being characterized by having a foam-filled internal portion and two downwardly extending fins at the rear of the buoy. A lifting eye is provided on the buoy at substantially the center of gravity of the buoy.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a side elevational view showing how the buoy of the present invention may be used to support an offshore geophysical cable;

FIGURE 2 is a side elevational view showing how the buoy of the present invention may be used in towing an air operative explosive unit;

FIGURE 3 is a side elevational view showing the buoy of the present invention utilized catamaran style;

FIGURE 4 is a side elevational view showing the buoy of the present invention supporting a cargo net, a missile unit and salvage cargo;

FIGURE 5 is a side elevational view of the buoy of the present invention utilized as a mine retriever;

FIGURE 6 is a side view of the buoy of the present invention; and

FIGURE 7 is an end view of the buoy taken along line 7—7 of FIGURE 6.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGURE 1 is a side elevational view showing a boat **10** in a body of water **12**. A cable which may be a geophysical cable **14** well known in the geophysical art may be coupled through connectors **16**, **18** and **20** to buoys **22**, **24** and **26** respectively. Buoys **22**, **24** and **26** will be explained in detail subsequently but in FIGURE 1 it is apparent that such buoys provide support to the geophysical cable **14** and provide a fixed depth for cable **14** from the surface of the body of water **12**.

FIGURE 2 is a side elevational view also showing boat **10** in a body of water **12**. A cable **30** may have coupled thereto an air operative explosive unit **32** well known in the geophysical art. Such air operative explosive unit **32** is coupled through lead **34** to a buoy **22**. Thus, the buoy **22** shown in FIGURE 22 provides support for the air operative explosive unit **32**.

FIGURE 3 is a side elevational view showing boat **10** in a body of water **12**. Line **36** is coupled to buoys **22** and **24** which are coupled catamaran style. Buoys **22** and **24** may be utilized for towing an instrument package to obtain various information from the body of water **12**.

FIGURE 4 is a side elevational view showing boat **10** in a body of water **12**. A cable **38** may be coupled to a buoy **22** which provides support for a net **40** having cargo **44** inside net **40**. The cargo **44** may be a valve, for example, which is utilized at the wellhead in an offshore well which is producing oil or gas. Also shown in FIGURE 4 is buoy **22** having a cable **46** coupled thereto and supporting a member **48** which may be a missile unit. Buoy **22** also may be coupled through lead **50** to cargo **52** which may be in the process of being salvaged in the body of water **12**.

FIGURE 5 is a side elevational view showing boat **10** in a body of water **12**. Boat **10** has buoys **22** and **24** coupled thereto through cable **54**. The buoys **22** and **24** may have a cable **56** coupled between buoys **22** and **24** to provide retrieval of a mine **58**.

FIGURE 6 is a side view of buoy **22**. Buoy **22** includes an outer housing **60** having a nose **62**. The housing may be constructed of lightweight Fiberglas. The rear of the housing **60** has a tapered upper portion **64** which is joined to cylindrical portion **66** from which extends a substantially triangular shaped fin **68**.

A rib **70** which may be made of steel is provided in the lower portion of the buoy and a lifting eye **72** is positioned substantially in the center of gravity of the buoy to allow the buoy to be lifted easily. Rib **70** and the lifting eye **72** may be an A-frame construction. The housing **60** is filled with foam under pressure to provide the required buoyancy.

A satisfactory buoy has been found to be one which is nine feet in length, weighing approximately 100 pounds. The distance from the nose to the tapered portion **64** has been found to be about 63 inches or 5¼ feet. The fin **68** may be 32 inches long and extend about 14 inches from cylindrical section **66**.

FIGURE 7 is a rear view of buoy **22** taken along line 7—7 of FIGURE 6. Fin **68** is shown positioned at 53.5 degrees from the horizontal plane and fin **74** also is positioned on the other side at 53.5 degrees from the horizontal. Thus the arc between fin **68** and fin **74** is 73 degrees with such arc being formed from a point which is the center of member **66**. The fins **68** and **74** are also constructed of foam filled Fiberglas.

Thus, it will be appreciated that the buoy of the present invention is a decided improvement over buoys known at the time the present invention was made. The buoy of the present invention is light in weight, will not sink if

partially destroyed, and will remain in a stable path while being towed.

Although a preferred embodiment of the invention has been shown and described, it will be appreciated by those skilled in the art that many modifications may be made without departing from the spirit of the invention.

I claim:

1. A buoyant article of manufacture including in combination

a unitary housing including a nose, a first cylinder coupled to said nose, a tapered portion coupled to said first cylinder, a second cylinder coupled to said tapered portion, a rib coupled to said first cylinder, and a lifting eye extending through said first cylinder and coupled through A-frame structure to said rib at substantially the center of gravity of said article of manufacture, with said nose, first cylinder and second cylinder all being on a substantially common horizontal plane extending along said rib, and

fin means coupled to said second cylinder, said fin means including first and second triangular, planar members positioned at arcuate distances of substantially fifty-three and one-half degrees from a horizontal plane with said rib being substantially in a vertical plane with respect to said first and second members, the hypotenuse side of said members forming leading edges toward said nose of said housing.

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U.S. Cl. X.R.

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