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(54) Underwater acoustic beacon.

(57) Acoustic marker for use at sea arranged in a pipe-shaped housing (11). In the one end there is space for a battery (12) which drives a transmitter (31) disposed coaxially around the housing at the other end, where there is arranged a pressure switch (24) covered by a membrane (27). The transmitter is switched on by the pressure switch when the pressure on the outside of the membrane exceeds a certain limit on the marker falling in water.

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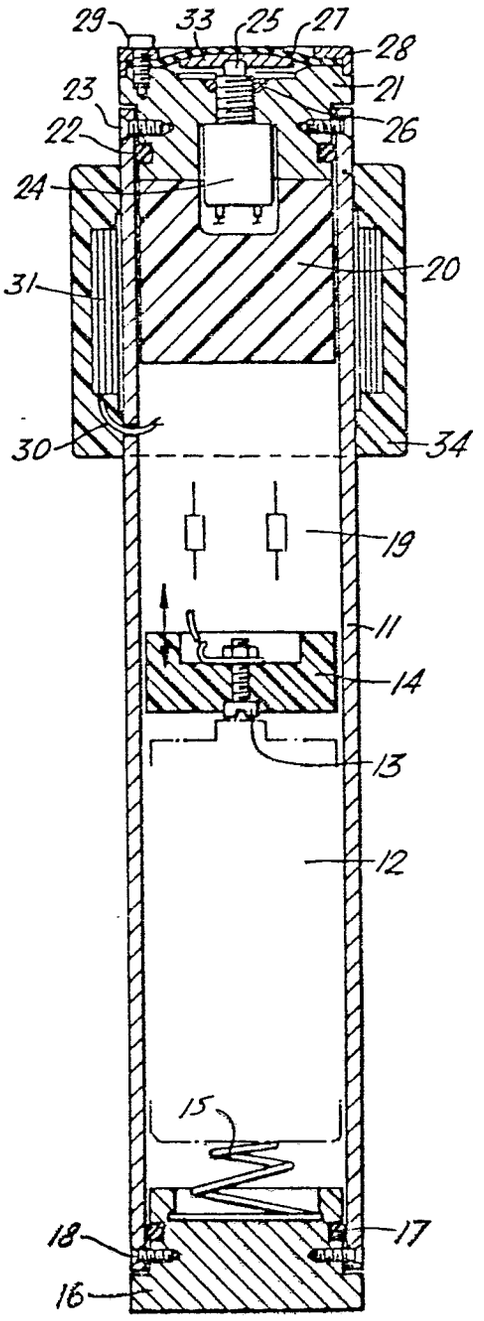
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TITLE MODIFIED
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ACOUSTIC MARKER

The invention relates to an acoustic marker of the kind which is indicated in the introduction to Patent Claim 1. Such a marker shall be used first of all to indicate the position of a boat or other object which is present below water, for example after a wreck.

The localising of wrecks today is a difficult, time-consuming and often expensive task. Often localising occurs by chance in that fishing operations take up parts which makes it possible to determine the position. Active localising can occur by means of acoustic fish-detection equipment, such as fathometers or sonars, or by way of side-searching sonars. If the position of the object, for example the wreck, is roughly known, under water television cameras can also be used.

The known methods and equipment are however time-consuming and expensive and as a rule demand that the position is roughly known beforehand.

The main objects of the invention are therefore to create an acoustic marker which in a submerged condition automatically transmits a localising signal which can be picked up by means of appropriate detection equipment. More particularly the problem is to create a marker with a practical design which permits reasonable manufacture and which can be stored in a position of readiness on vessels or objects which are exposed to sinking in water, without the risk of functional disturbances.

According to the invention this task can be accomplished by designing the marker in accordance with the characterizing portion of Patent Claim 1. This design provides firstly a simple construction with reasonable components. It gives a favourable radiation effect and is easy to make durable against the influences which are prevailing during storage in readiness and use.

Further advantageous features of the invention are stated in the dependent claims.

The invention will be described further below with reference to the drawing, which shows an axial section through an example of an embodiment.

There is used in the example as a housing for the marker a pipe 11 of a corrosion-resistant or surface-treated material. At the one end of this pipe there is arranged a battery 12 in the form of one or more monocells of known design. One terminal of the battery forms an abutment against a contact screw 13 which is fixed on a contact piece 14 within the pipe. The other terminal forms an abutment against a compression spring 15 which is pressed against the battery in order to hold it and provide contact with an end plug 16 which forms a seal against internal walls of the pipe 11 by means of a gasket 17, the plug being fastened with two locking screws 18 which pass through the pipe 11.

Up to the contact piece 14 there are arranged one or more sheets 19 with printed circuits, which support electronic parts of the transmitter. This sheet can be designed in a fundamentally known manner and will therefore not be described further here. The sheet 19 is supported at the other end of an intermediate piece 20 which is held in place by a second end plug 21. In a manner corresponding to the end plug 16 the end plug 21 is made tight against the pipe 11 by means of a gasket 22 and held by two locking screws 23.

In addition there is arranged in the end plug 21, for example screwed in, a pressure switch 24 with an activating means 25 which projects outwardly of the end of the plug, the pressure switch being fastened with locking nuts 26. The activating means 25 is isolated from the surroundings by means of a membrane 27 of appropriate material, for example rubber, which is held on the end plug 21 by means of a clamping ring 28 which is fixed by a series of screws 29. In order to reduce the risk of wear on the membrane 27 under the influence of the activating means 25, there is arranged between the membrane and the means a pressure plate 33, preferably of metal or hard plastic.

By means of the pressure switch 26 the transmitter on the sheet or sheets 19 is connected, that is to say is supplied with electric current, so that there are emitted signal pulses of predetermined form and frequency via an outlet lead 30.

The lead 30 is connected to a transmitter or transducer 31 which is wound around the pipe 11 in the region of the intermediate piece 20, via a sleeve-shaped base 32 which lies externally on the pipe wall. External portions of the transmitter terminal 31 and the lead 30 are moulded into an external cylindrical block 34 of suitable moulding material.

The pressure switch 24 is arranged so that it is activated, that is to say connected, when the pressure which acts on the membrane 27 exceeds a certain threshold value which corresponds to a specified particular depth.

Such a marker can first and foremost be used to mark sunken vessels. However, it can also be utilised for other purposes, for example for marking fishing operations and the like. A natural application will be in connection with a pressure-registering sensor, so that in addition to giving position the transmitter will also indicate depth. As a result the possibility is open for fishing boats to utilise the transmitter also to provide information concerning the depth of the fishing operation. This is relevant for exemple in purse seining and trawling.

The marker according to the invention will be very quick to operate, the pressure switch starting the transmission instantaneously when the predetermined depth is reached.

The transmitter will thus be an acoustic transmitter. It can for example send out pulses having a length of the order of magnitude of 30 ms approximately every 4 seconds. Commercial sonar equipment willthen be able to be used for sounding and detection.

PATENT CLAIMS

1. Acoustic marker for objects at oceanic locations, especially for marking sunken vessels, having a battery-driven sound transmitter which is activated by means of a switch which switches on the transmitter when the marker is lowered down in the sea, characterized in that it has a pipe-shaped housing (11) where at the one end there is space for a battery (12) and where in the other end there is arranged a pressure switch (24) which is switched on in response to a certain pressure from the medium which surrounds the marker.

2. Acoustic marker in accordance with claim 1, characterized in that the one end of the pipe-shaped housing (11) which receives the pressure switch (24) is covered tightly by a membrane (27) which allows the transfer of pressure from the surrounding medium to the pressure switch (24).

3. Acoustic marker in accordance with claim 1 or 2, characterized in that the pressure switch (24) is arranged in an end plug (21) which is sealingly inserted in the end of the pipe-shaped housing (11).

4. Acoustic marker in accordance with claim 2 or 3, characterized in that the membrane (27) is arranged over the outwardly facing surface of the end plug (21).

5. Acoustic marker in accordance with any of claims 1-4, characterized in that the pipe-shaped housing (11) supports the transmitter (31) coaxially at the end where the pressure switch (24) is located.

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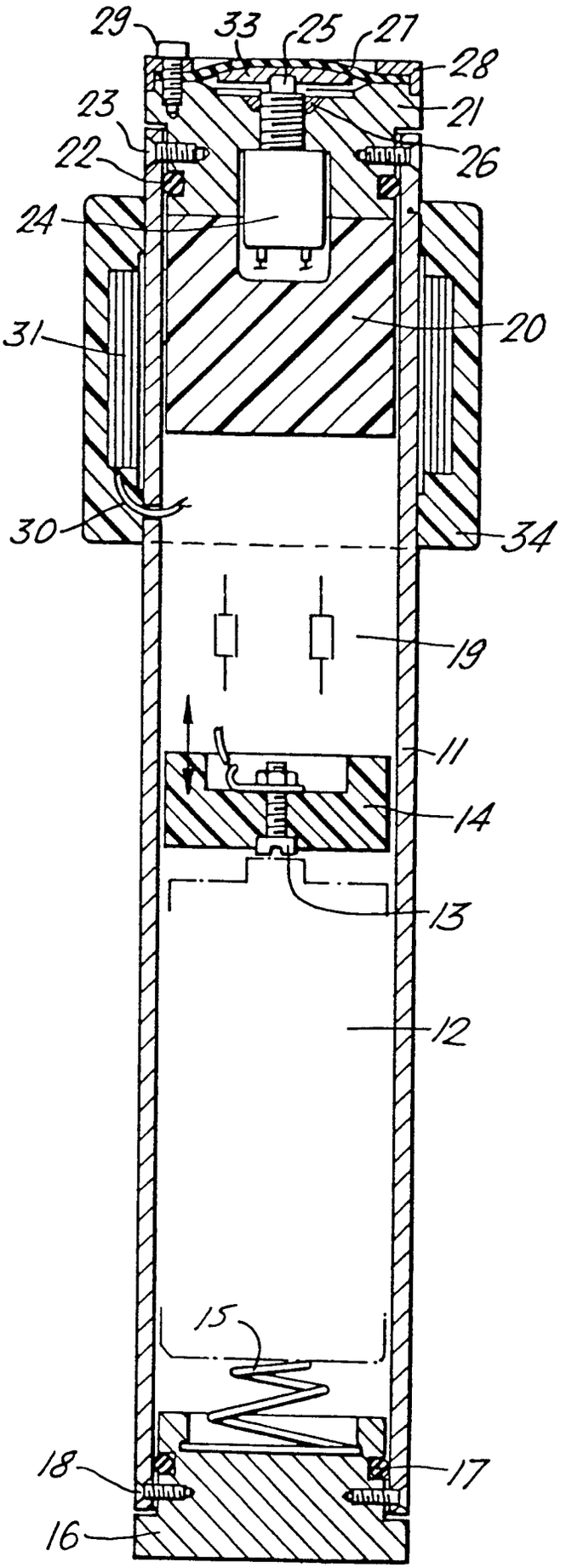

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EUROPEAN SEARCH REPORT

Application number
EP 80 85 0109

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	US - A - 3 686 656 (C.D. RICHARDS) * Abstract; figure 3 *	1

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

B 63 C 7/26
G 10 K 9/22

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

G 10 K 9/28
9/22
B 63 C 7/26
G 08 B 3/06
G 01 S 1/72

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	17-10-1980	HAASBROEK