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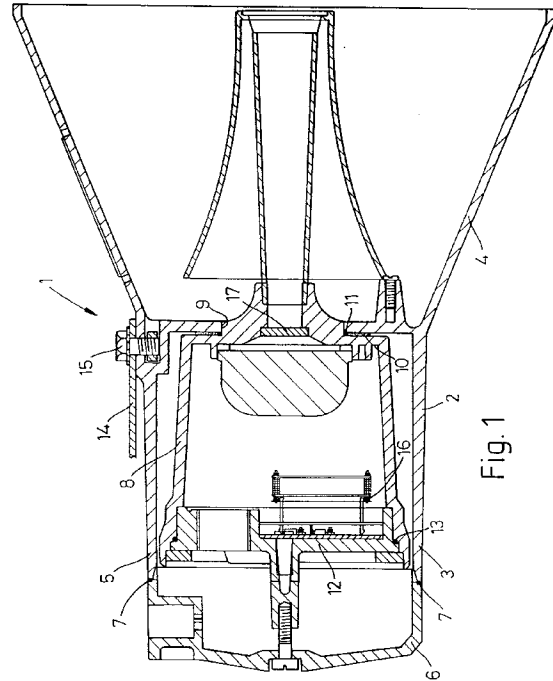
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**Loudspeakers.**

A remote controlled loudspeaker comprises a main housing, an explosion-proof body provided within the main housing and means for controlling the loudspeaker, the control means are located within the explosion-proof body such that in the event of an emergency the loudspeaker may continue to be operated from a remote location.



This invention relates to loudspeakers and in particular provides loudspeakers for emergency public address in remote or hazardous areas such as on off-shore oil/gas platforms and drilling rigs.

Loudspeakers are often used in hazardous areas to provide audible warnings as an integral part of the safety features of the area. In the event of any serious accidents or emergency procedures it is imperative that the work-force and any emergency teams can be given precise information regarding the incident and what steps must be taken such as decks to be cleared or, in the event of a serious fire, the procedure and route for the installation to be evacuated. In such circumstances it is imperative that the loudspeakers function for as long as possible in emergency conditions especially during fire as lives may be lost if such loudspeaker equipment is affected by a fire.

At present, the control electronics for the public address speakers are generally located in a safe area on the installation and cables are run from this area to the speakers. The loudspeakers are then controlled from a remote location such as a radio room or control room.

The present arrangement uses large amounts of cabling which is susceptible to damage during an emergency such as an explosion or fire on deck.

The present invention therefore aims to overcome the disadvantages of known loudspeaker equipment and to provide a loudspeaker which will continue to function in hazardous conditions.

According to one aspect of the present invention there is provided a remote controlled loudspeaker comprising a main housing, an explosion-proof body provided within the main housing and means for controlling the loudspeaker, wherein the control means are located within the explosion-proof body such that in the event of an emergency the loudspeaker may continue to be operated from a remote location.

Sealing means are provided to seal the explosion-proof body within the loudspeaker. The sealing means may be in the form of silicone rubber O-rings and a sintered disc.

One embodiment of the present invention will be described with reference to and as shown in the accompanying drawings, in which:

FIGURE 1 is a side view of a loudspeaker according to one aspect of the present invention;

FIGURE 2 is a schematic view of one embodiment of control electronics for the loudspeaker of FIGURE 1, and

FIGURE 3 is a schematic view of a further embodiment of control electronics for the loudspeaker of FIGURE 1.

Referring now to the figures there is described a loudspeaker 1 comprising a main housing 2 having a cylindrical portion 3 and a frustoconical horn portion 4. The housing 2 is formed of an anti-static compound (CENELEC EN 50014-6). One end 5 of the housing

2, remote from the frustoconical portion 4, is provided with a cover portion 6 which is sealed in position by a silicone rubber O-ring 7.

A flame-proof, explosion-proof body 8 made from aluminium alloy (DS-4261 equal to LM6) is located within the cylindrical portion 3 of the housing. The body 8 extends through an aperture 9 in the main housing 2 within the horn 4 of the housing 2 and is sealed by a cork sealing gasket 10 and a silicone rubber O-ring 11 and sintered disc 17. At the other end of the housing 2 the body 8 is closed by an explosion-proof enclosure cap 12 and is sealed by a further silicone O-ring 13 within the cylindrical portion 3 of the housing 2.

An antenna (not shown) is provided within the cover portion 6 of the housing 2. A bracket 14 is fixed to the main housing 2 by a suitable fixing means such as a screw 15. The loudspeaker may be mounted in any desired location.

The control electronics 16 for the loudspeaker are located within the explosion-proof body 8 and are described below.

As shown in Figure 2, an RF carrier set to the correct frequency is received by an RF unit 17. The modulation from the receiver 17 is then passed to a processor unit 18 where it is fed to a CTCSS decoder. This is programmed for detection of one of 38 standard sub-audible tones. If a tone is detected, the audio signal is then filtered to remove any high frequency noise and passed to a mute circuit 19. The mute circuit 19 ensures that in a condition of no received carrier into the receiver 17, no unwanted noise is fed to the last amplifier. From the volume control the audio signal is fed to a power amplifier which then feeds the signal to the speaker.

In an enhanced version of the control electronics as shown in figure 3, after the signal is passed through the mute circuit 19 it is fed to an electronic volume control and a DTMF receiver 20 (or decoder).

To enable the audio paths in this embodiment, the correct DTMF sequence must be received, which upon being decoded is fed to an 8 bit Micro Controller 21. Here it is checked for validity and also checked to establish ident, as each unit has its own individual ident no. If all the above parameters are met then the MCU 21 carries out such commands as change channel on radio, adjust volume level, turn CTCSS decoder on/off, unmute speaker, and generate emergency alarms.

When the audio path has been opened by the MCU 21 then the speech is fed to the power amplifier which then feeds the speaker.

It can be appreciated that in the event of an emergency such as a fire or explosion the loudspeaker 1 as described above may be operated from a remote location such as a helicopter in the area. Vital instructions may be given to personnel on the installation thus aiding evacuation from the area.

Furthermore, as the control electronics for each loudspeaker are provided within the explosion-proof body 8 inside the individual loudspeaker housing this eliminates the requirements for lengthy 100 volt line audio transmission cables which are prone to damage in the event of an explosion or serious fire. Each speaker is a "stand-alone" unit, no audio interconnection wires are necessary as with conventional systems.

Power to the unit may be fed via an uninterrupted power supply from the installation source or via a custom designed unit which would trickle charge from the installation mains and revert to emergency supply when the said mains supply is lost. The custom UPS would be likewise explosion proof and located as close to the loudspeaker as to maximise safety.

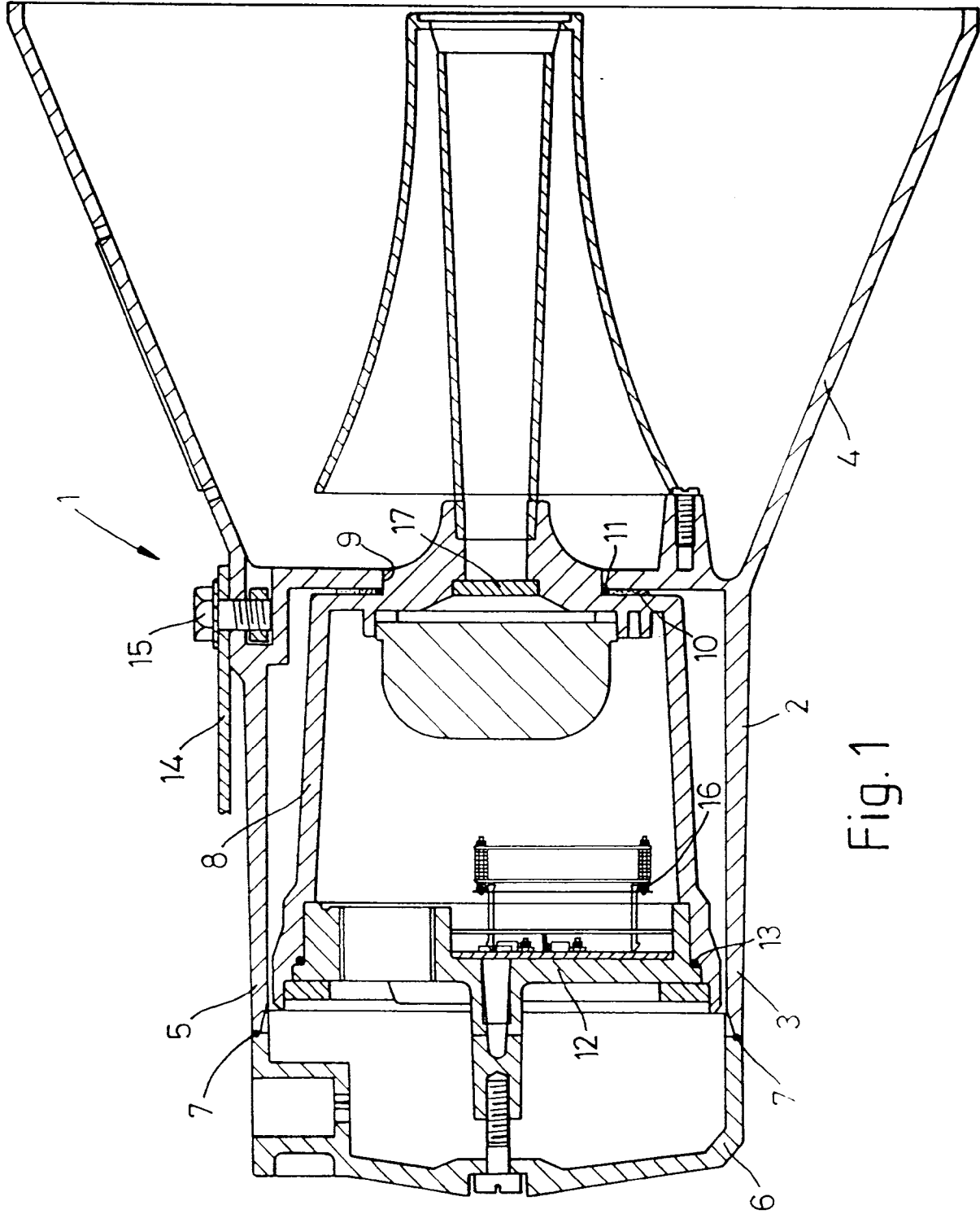
It is to be understood that the loudspeaker as described above may be located in any area where it is advantageous for public address announcements.

### Claims

1. A remote controlled loudspeaker comprising a main housing, an explosion-proof body provided within the main housing and means for controlling the loudspeaker, wherein the control means are located within the explosion-proof body such that in the event of an emergency the loudspeaker may continue to be operated from a remote location. 25
2. A remote controlled loudspeaker according to claim 1, wherein sealing means are provided to seal the explosion-proof body within the loudspeaker housing. 35
3. A remote controlled loudspeaker according to claim 2, wherein the sealing means comprises a plurality of silicone-rubber o-rings and a sintered disc. 40
4. A remote controlled loudspeaker according to any one of claims 1,2 or 3, wherein power is supplied via an uninterrupted power supply from the installation source. 45
5. A remote controlled loudspeaker according to any one of the preceding claims, wherein the control means comprises an RF unit, a processor unit, a decoder, the decoder being set for detection of one of a number of signals, and an amplifier for amplifying the signal. 50
6. A remote controlled loudspeaker according to claim 5, wherein the control means further comprises a filter and a mute circuit ensuring no unwanted noise is fed to the amplifier. 55

7. A remote controlled loudspeaker according to claim 6, wherein the control means further comprises a volume control unit, a decoder and means for checking the validity and identity of a signal .

8. A remote controlled loudspeaker according to claim 7, wherein the means for checking the validity and identity of the signal comprises a micro controller.



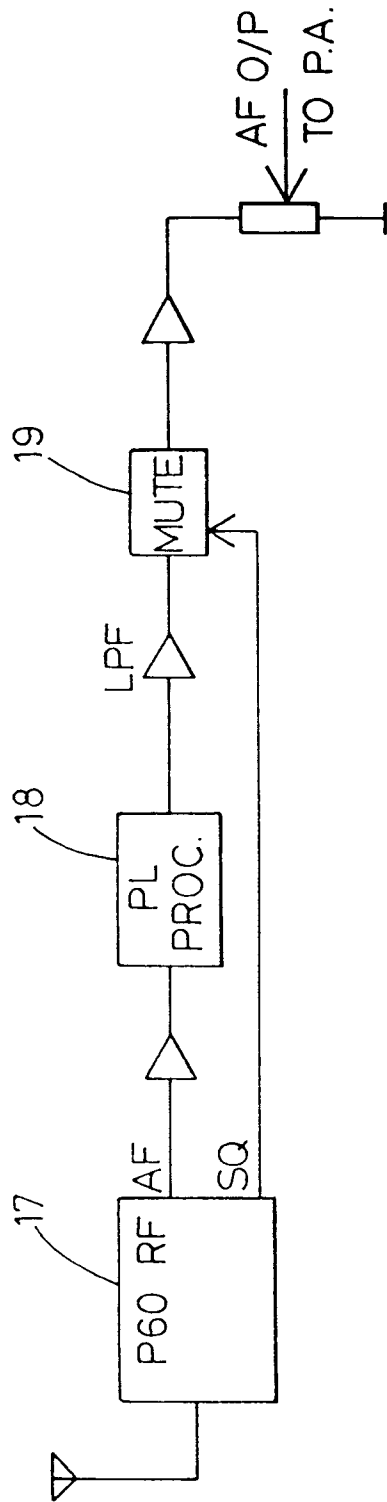


Fig. 2

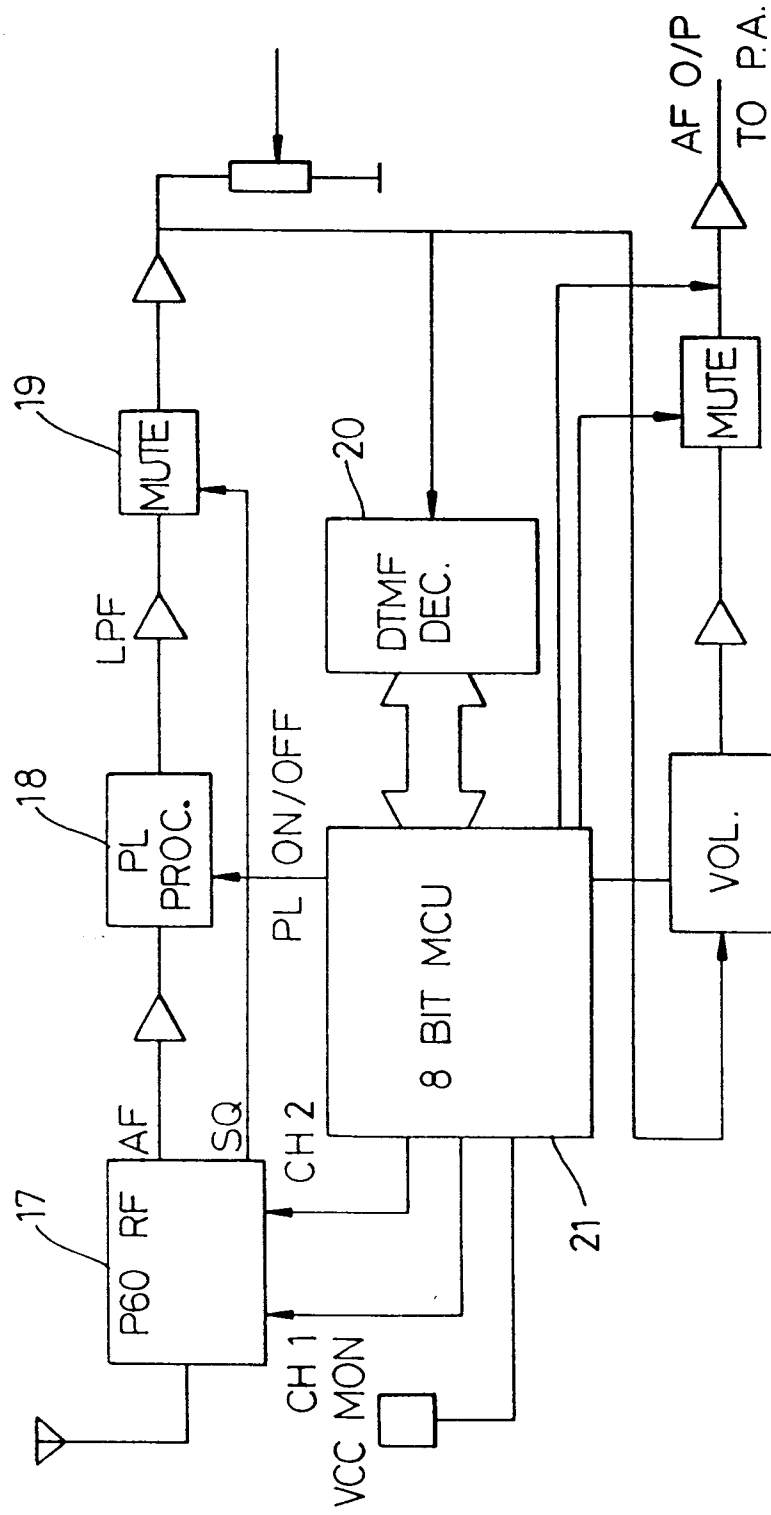


Fig. 3



European Patent  
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 30 0019

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-2 199 466 (G.L.COMMUNICATIONS) * page 1, line 1-5 * * page 3, line 1 - page 4, line 19 * * page 5, line 26 - page 7, line 2 * * page 8, line 9 - page 10, line 27 * ----	1,4-8	H04R1/30
A	EP-A-0 180 423 (STEGER) * page 1, line 6-14 * * page 3, line 15 - line 23 * * page 6, line 22 - line 6 * ----	1-5	
A	US-A-4 958 154 (LÜBER ET AL.) * column 1, line 32 - line 38 * * column 1, line 67 - column 2, line 52 * -----	1,5-8	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			H04R G01N G08B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 MAY 1993	Examiner ZANTI P.V.L.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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