

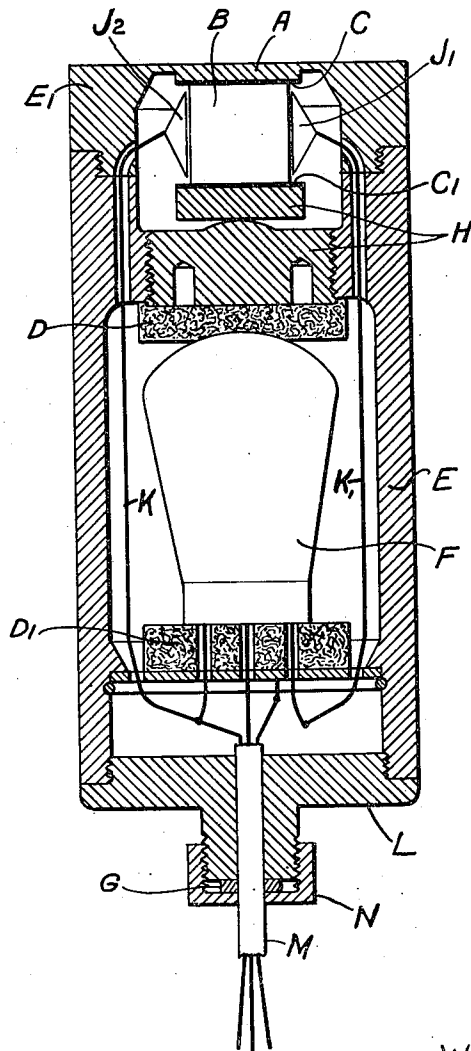
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APPARATUS FOR RECEIVING COMPRESSIONAL WAVES

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APPARATUS FOR RECEIVING COMPRES- SIONAL WAVES

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2 Claims. (Cl. 177—386)

The present invention relates to a receiver for
compressional waves particularly for use in sub-
marine signaling. More particularly the present
invention relates to submarine sound receivers in
5 which the piezo-electric effect of bodies, such as
Rochelle-salt crystals, is employed.

In submarine signaling systems in which piezo-
electric crystals have been used as receivers, the
receiver must be mounted in close proximity to
10 the water. Such receivers are usually mounted
in the skin of a ship, projected through a tube
beneath the ship or suspended in a tank at the
bottom of the ship. The indicating devices to
which the energy from the receiver is conducted
15 are usually, on the other hand, mounted in the
upper part of the vessel, for example, in the
wheel house.

Amplifiers are in practically all cases required
and these have in the past been mounted in the
indicator box or adjacent to the indicator. The
cable connecting the amplifier with the receiver is
consequently quite long and has a large capacity
20 which interferes with the efficient operation of
the system. The present invention avoids this
difficulty.

By means of the present invention the sensi-
tivity of the system is substantially increased.
Furthermore, by virtue of the present invention
the electric and magnetic disturbances which are
30 picked up by the cable bear a much smaller ratio
to the useful signaling energy. According to the
present invention the first vacuum tube of the
amplifier is mounted in the immediate proximity
and preferably in the same housing with the
35 piezo-electric receiving body.

The invention may be better understood with
reference to the accompanying drawing which
shows a receiving device constructed according
to the present invention.

40 A piezo-electric body, for example, a Rochelle-
salt crystal B, is mounted in a housing E and is
pressed against a piston diaphragm A by means
of a pressure device H. The diaphragm A is
thus firmly pressed against the crystal B and
45 possesses no undesired natural frequency. The
rim E₁ of the diaphragm is constructed to form
a portion of the walls of a cylindrical housing.
Screwed to the portion E₁ is a cylinder E which
forms an extension of the walls of the housing.
50 Within the housing and in the immediate vicinity
of the piezo-electric crystal B there is mounted a
vacuum tube F supported by resilient material,
for example, sponge rubber D and D₁, in order
to prevent undesired vibrations.

55 The crystal is insulated from the housing and
the pressure arrangement H by means of layers

C and C₁ of insulating material. Electric energy
is conducted from the crystal through the elec-
trodes J₁ and J₂, built up of tin foil and cemented
to the surfaces of the crystals, and the leads K
and K₁ to the vacuum tube F which forms the
5 first tube of the amplifier. The lower end of the
housing is closed by a disc L through which cable
M connects the device to the amplifier. The cable
M is made watertight by means of the gasket G
10 and a cap N.

It is understood that more than one vacuum
tube of the amplifier may be mounted within the
casing containing the crystal or in a separate cas-
ing in the immediate vicinity of the crystal. It
is, however, sufficient to place a single tube within
15 the casing and the remainder of the amplifier
at some remote point convenient for operation.
The remainder of the amplifier has not been
shown since its particular design forms no part
of the present invention with the exception that
20 the tube shown is intended to form the first tube
thereof.

Having now described my invention, I claim:

1. A submarine sound receiver comprising a
cylindrical casing having a diaphragm at one
25 end thereof, a piezo-electric crystal positioned in
contact with said diaphragm, a plate positioned
against the surface of said crystal opposite the
surface of contact with the diaphragm, means
closing said crystal in a chamber at the end of
30 said casing, said means being threaded in said
casing and adapted to exert pressure on said
plate, a second chamber in the other part of said
casing, means closing said second chamber at
the end of said cylinder, said chamber being
35 provided with a supporting shelf, a vacuum tube
amplifier supported on said shelf and means po-
sitioned just below the means closing said first
chamber for securing said vacuum tube firmly in
position.

2. A submarine sound receiver comprising a
cylindrical casing having an internally extending
flange within the casing, partition means thread-
ed to said flange to form two compartments
45 therein, means closing one end of the casing
forming a diaphragm at said end, means resting
on said partition means, a piezo-electric crystal
positioned on said last means and adjusted to
contact the inner face of the diaphragm, a vac-
uum tube and means for positioning the vacuum
50 tube within the second compartment including
means positioned between the partition and the
vacuum tube for firmly holding the vacuum tube
in place and means attached at the other end of
the casing for closing the same.

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