

PART III

NOTES, ABSTRACTS AND NEWS

NOTES:

ACOUSTIC INSTRUMENTS FOR THE STUDY OF THE REACTION OF FISHES

There are many improvised methods practised at present for attracting fishes by sound. Fishermen produce sounds by beating on the body of dugout canoes and catamarans for scaring fishes. In inland fisheries a metal bell is sometimes used over water for producing sound. All these methods are much inconvenient and inefficient. Moreover the particular frequency and type of sound to which the species of fishes are to be attracted, have to be determined after detailed study for obtaining the best results. According to the results obtained from the works done in U. S. S. R. and Japan, the sound audible to fishes is almost the same as that to the human beings, i.e; from 30 Hz to 10000 Hz.

Two instruments are described in this communication developed for the study of the reaction of fishes towards sound. The electrical instrument produces intense sound of a fixed frequency under water while the electronic one produces slightly less intense sound of continuously variable frequency from 100 Hz to 8000 Hz. The intensity of sound also can be varied continuously from zero to maximum, in the latter instrument.

THE ELECTRICAL INSTRUMENT

The device was developed for producing intense audible sound under water and

simple in construction. It consisted of an electric horn encased in a strong metallic box as shown in Fig I. The horn was operated from a 12 V accumulator. The chamber encasing the horn was designed for the minimum damping of the sound waves produced by it. The thin brass diaphragm in front of the horn was vibrated by the sound resulting in the transmission of the same to the water in contact with it. The chamber was made water-tight by providing a rubber packing along the face of the screwing arrangement. The upper side and the hole through which the electrical wire was taken out, were made fully water tight by sealing them with water proof synthetic compound. The horn was mounted by means of a special cantilever

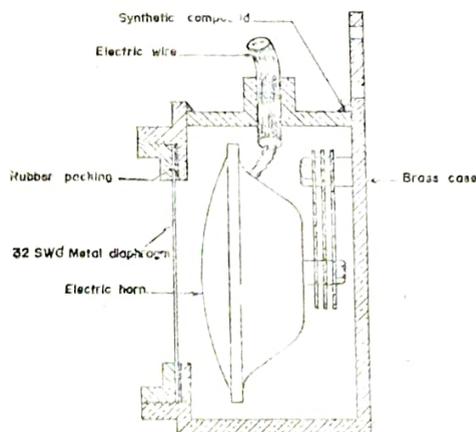


Fig 1. The electric horn encased in a metallic chamber.

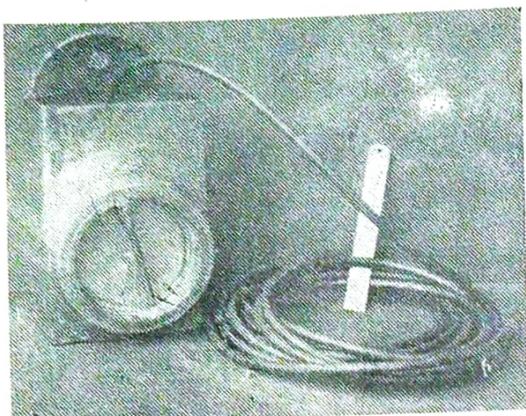


Fig 2. The brass chamber containing the horn along with the electric cable.

for reducing the damping of the vibrations. Fig 2 shows the photograph of the chamber containing the horn along with the cable. On testing, the sound produced by the horn was found to be audible to a normal

ment consisted essentially of (1) a solid state electronic unit, (2) a 12 V battery for energising the above and (3) an under-water speaker for converting the electric signals into acoustic waves. A two-core electric wire carried the signals from the electronic unit to the under water speaker. As shown in Fig 3, the electronic unit consisted of a multivibrator with two bands, 100 c/s to 1500 c/s and 1200 c/s to 8 kc/s. The frequency of each band could be conveniently adjusted by working on the potentiometer p1. The pulses were amplified in two stages and fed to the underwater speaker. Another potentiometer P2 helped to control the intensity of the electric signals.

The under-water speaker was an ordinary 6", 3 ohm speaker encased in a

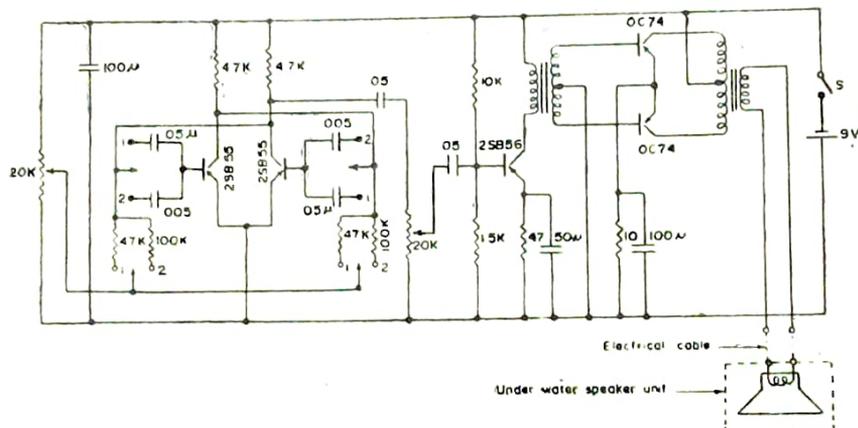


Fig 3. The circuit of the electronic instrument for producing variable frequency electric pulses at variable intensities.

human ear upto a distance of about 300m under water.

THE ELECTRONIC EQUIPMENT

This equipment was developed for studying the behaviour of fishes towards different sounds at various intensities. The equipment can be adjusted to produce sounds of any frequency within the range 100 c/s to 8 kc/s. The intensity of the sound can be controlled within the range 0 to maximum, continuously. This instru-

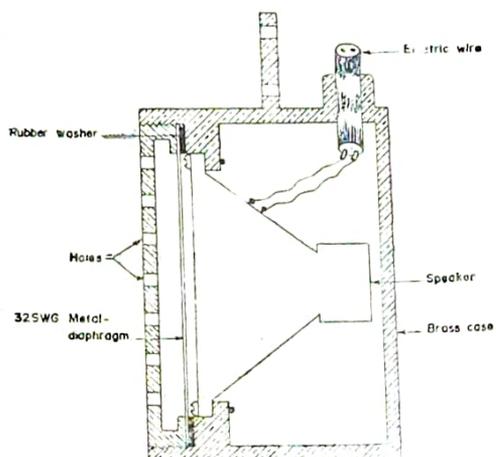


Fig 4. Cross section of the under-water speaker.

water-tight chamber, similar to the previous case. The thin brass metallic diaphragm placed before the speaker, helped easy transmission of the sound waves into water. Fig 4 shows the diagram of the under-water speaker. The photograph (Fig 5) shows the under-water speaker, the electronic unit and the electric wire. The sound produced by the speaker was audible to a normal human ear upto a distance of about 100 m. However, at low frequencies, the range of transmission was found to have reduced to about 80 m.

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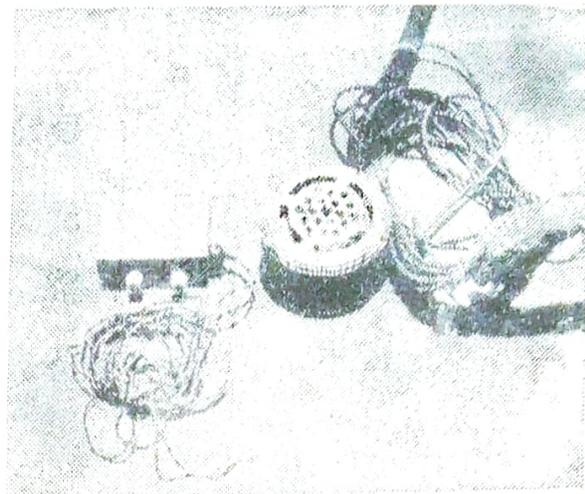


Fig 5. The under-water speaker and the electronic unit along with the electric cables.

sincere encouragement during the course of the development of the instruments.