



SOUND-RANGING APPARATUS

by the

CAMBRIDGE SCIENTIFIC INSTRUMENT COMPANY, LTD.

This apparatus has been developed for determining the position of sources of sound, for land purposes. The apparatus comprises a series of hot wire microphones of the type devised by Major W. S. TUCKER, R. E., which are placed at suitable positions according to the direction of the source. The microphones are made sensitive to pressure waves of low frequency, such as are caused by the explosion of a cartridge, and each microphone is connected to one of six fine conducting wires which form the moving system of a galvanometer of the EINTHOVEN type. When the pressure wave from the discharge reaches the microphone, it causes a small temperature change in the microphone which gives rise to an out-of-balance effect in a bridge circuit, resulting in a deflection of the corresponding wire in the galvanometer. The microphone nearest to the source of sound will receive the pressure wave first, whereas those more distantly placed will receive the pressure wave in strict relation to their distance. The record obtained, therefore, consists of a series of deflections, the distances between which indicate the differences in distance between the source and the various microphones. By plotting these differences, it is possible to localise the exact position of the source. The images of the wires are projected by means of an optical system and lamp upon a moving strip of sensitive photographic paper, the time datum-lines for measuring the record being obtained by means of a time-marker controlled by an electrically maintained tuning fork. The complete apparatus is controlled through an electric relay by a single switch which is normally operated immediately the sound of the explosion is heard by an observer in an advanced position. Since the speed of sound is less than 200 metres in half a second, if the observer is this distance nearer the source than the nearest microphone, the apparatus will be in full operation before the pressure wave reaches the microphone. The camera, the design of which is largely due to Professor W. L. BRAGG, comprises a light-tight box containing a roll of bromide paper which is fed past a slit *C* by means of an electric motor with a centrifugally operated quick-starting switch. The images of the six fibres are focussed on this slit, being brought sufficiently close together, by means of six small marked prisms, for all to fall on the narrow band of paper. The exposed paper is automatically fed into a chamber, where it is quickly developed by means of a stream of concentrated developer; it is then fed into a tank containing fixing solution and, finally, out of the machine for observation. The developed record is available for measurement in less than 30 seconds after the operating switch is closed.

Further particulars will be given on application to the Cambridge Scientific Co., Ltd., 45, Grosvenor Place, London, S. W. 1; representatives of this Company are to be found in most countries of the world.
