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A PORTABLE FIRE DETECTOR

by

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It occasionally happens that buildings become smoke-logged during fires and as it is not feasible to extract the smoke the fireman is faced with the problem of locating the fire. In thick smoke vision is limited to a few feet and it is only possible to get some idea of the direction of the fire by the sensation of heat. The skin in fact is able to perceive the long wave heat radiation which penetrates the smoke and to which the eye is quite insensitive. Even so the skin is a comparatively poor indication of radiation; the noonday sun which is dazzling to the eye produces only a pleasant sensation of warmth on the skin, and moreover, the skin has a poor directional response so that altogether the unaided senses are not very effective in locating fires.

Due to the development of photoconductive cells which are sensitive to heat radiation it has now become possible to produce a portable fire detector. These cells have the property that their resistance is reduced when heat radiation is allowed to fall on them, and to detect radiation it is only necessary to connect the cell in a circuit as shown in Figure 1.

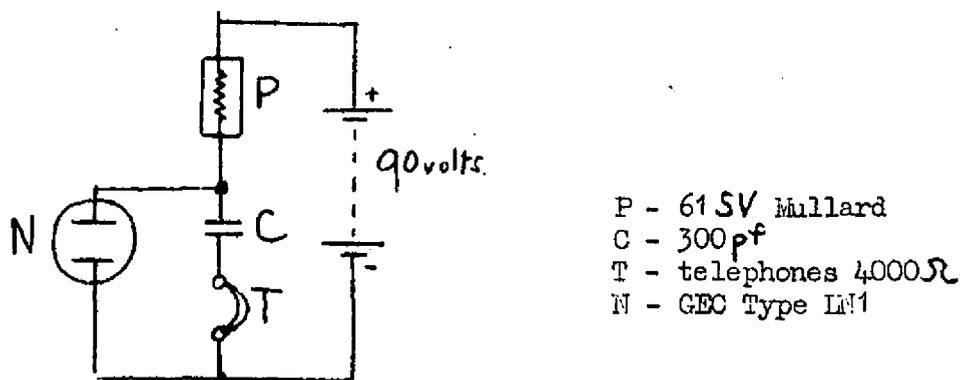


Figure 1

The 90 v battery charges the condenser C which is connected in series with the photocell and a pair of telephones. When the potential across the condenser reaches the striking potential of the neon tube N it is discharged through the telephones and the charging cycle starts again. If this happens rapidly enough an audible tone is heard in the telephones. The pitch of the tone depends among other things on the resistance of the photocell P and if this is lowered due to radiation incident on the photocell the pitch is raised. In order to collect as much radiation as possible the photocell is mounted at the focus of a mirror, preferably metal; a car headlamp reflector would be suitable. The very simple electrical circuits can be grouped behind the mirror, and as the current consumption is low, being less than 0.05 m.a., a small battery can be used. A general view of the apparatus is shown in Plate 1 and with the 10½ in. mirror shown it is possible in a clear atmosphere to detect the heat from a candle flame at 60 ft, though in very dense smoke this distance would be considerably reduced. Besides responding to flames, this apparatus will also detect smouldering, provided it has broken through to the surface of a heap.

The ideal apparatus would, of course, be one enabling firemen to actually see in smoke, but this is impracticable at the present moment, and indeed in the foreseeable future. In the meantime this simple equipment should prove useful in treating fires under difficult conditions.



PLATE. I. GENERAL VIEW OF APPARATUS