Telephone Set for Hazardous Areas

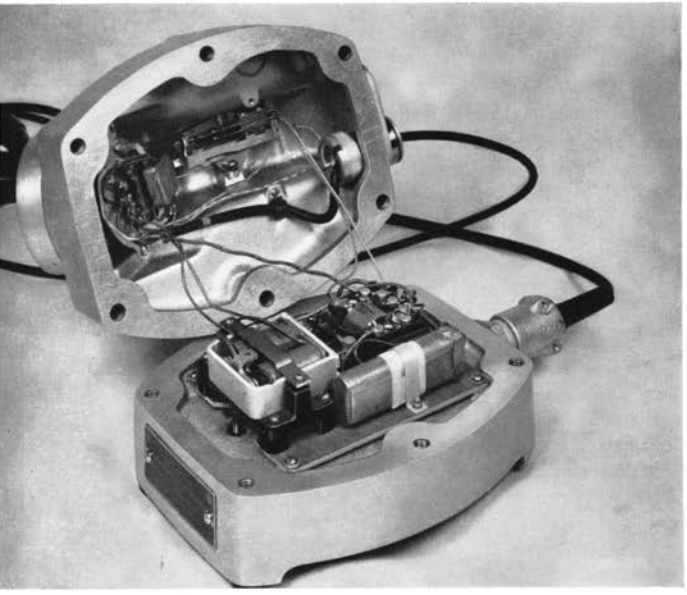

Fig. 1 — Induction coil, capacitors, and ringer are mounted in the base insert; switch and dial mechanisms in the cover. The screw-type shaft operating the clapper is on the left side of the base.

Although the standard telephone set is perfectly safe for all ordinary operations, a special set and special precautions are necessary when telephone service is required in areas where explosive gases may be present. In such areas, the small sparks that might occur inside a set could be dangerous. To meet such situations, the Bell System supplies the 320-type set*, suitable for either wall or pedestal mounting. The continued expansion of the chemical industries, however, and of such installations as the pumping stations located along pipe lines, has caused a demand for a desk-mounted set to supplement the previous model.

The KS-14476 telephone set, developed by the Station Apparatus Development Department, is desk-mounted and meets the requirements of the National Electric Code and Underwriters Laboratories for most hazardous areas. A Crouse-Hinds explosion-proof housing was already available, and

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into it Laboratories engineers have incorporated the Western Electric apparatus. The completely assembled set is shown in Figure 1.

Fundamentally, this set is designed not to prevent the ignition of explosive gases, but to prevent the escape of flame from inside the housing should any internal explosion occur. Even though the internal components might be damaged, the set itself will not constitute a hazard to the area in which it is mounted.

A critical factor involved in the design is the close tolerance maintained at the points where shafts enter the housing – for example, the shaft that operates the externally mounted clapper and gongs shown in Figure 2. A close-fitting bushing and a sufficient length of shaft ensure that any internal flame will be cooled to extinction along the side of the shaft before it reaches the outside of the set. To avoid excessive shaft lengths, however, the KS-14476 uses threaded shafts for the ringer and dial mechanisms, the effect of which is to provide a flame path around the threads of the screw equivalent to a much longer smooth shaft. When securely bolted together, the base and top cover of the set thus protect the outside atmosphere from any flame that might be caused by internal sparks.

Several other precautionary measures are taken. Two high resistances are bridged across the capacitor units mounted in the base, shown in the lower part of Figure 1, to remove any charges that might be stored in the capacitor before the set is opened. The transmitter and receiver units are so designed that removing the outside caps will not interrupt the circuit and create a hazardous condition. To prevent malfunctioning of the set's external elements, rigid metal conduit brings the line into the hazardous area, and fittings are filled with sealing compound. The rigid conduit runs to a Condulet fitting and the flexible line cord and hand-set cord enter the metal housing by means of special explosion-proof glands. Protectors with fuses in the line circuit are installed outside the hazardous area, additional protectors being required when the line circuit is near high voltages.

The installation and maintenance of this set are rigidly controlled. It is installed only upon proper authorization, and care is taken that the installation procedure does not create hazardous situations. Line connections are always disconnected before the set is opened, and to obtain full protection, periodic inspections are required so that broken or worn parts may be replaced, and other abnormal conditions, however slight, may be corrected without delay. Sets that require major repairs are taken outside the hazardous area.

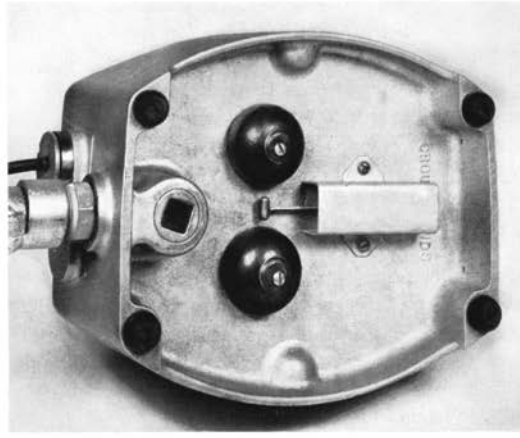

Fig. 2 — The clapper and gongs mounted on the underside of the base. Also shown are the sealing glands through which the line cord and the hand-set cord enter the set.

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