The device which has been fabricated consists of a modified high-intensity lamp fixture interlocked with the X-ray machine *via* a relay circuit. The lamp fixture has a magnetic base and a gooseneck holder. These features make it easy for one to position the lamp at the point of maximum concern. Many types of visible indicators such as xenon lamps, neon lamps, and solid-state light emitting diodes were considered; none could compete with the incandescent lamp for the combination of low cost, high visibility, and long life. The best combination of brillance and long life found was a 1815 fourteen-volt lamp derated to ten volts.

The interlock circuit (Fig. 1) consists of a DC power supply that energizes a series lamp–relay combination used to turn OFF the X-ray machine in the event of a lamp failure. DC power was used because power consumption is lower than with AC and there is no annoying relay noise. The possibility of an electric shock was eliminated by transformer isolation and a low-voltage interlock chain.

Both the relay and the power supply are packaged in a conventional cast electrical outlet box which is mounted on the outside of the X-ray machine.

For most X-ray generators, the installation is simple and quick. Three wires are connected to the X-ray ON' power source and the 'X-ray ON' relay. The lamp fixture is plugged into the circuit box with a phone jack. The magnetic base of the lamp fixture is usually placed on the steel table top but can be placed on top of the X-ray tube if desired.

This device has been in use for several months, is low in cost and can easily be assembled from parts usually available in the shop or laboratory. Further details will be supplied on request.

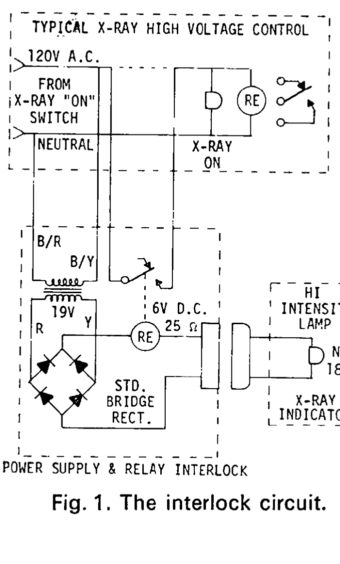

Fig. 1. The interlock circuit.

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Letter to the Editor

Synergistic identification by energy-dispersive diffractometry

Sir,

Energy-dispersive diffractometry offers the possibility of sample characterization with simultaneously obtained X-ray diffraction and X-ray fluorescence data.

Identification of materials by means of their X-ray powder pattern is the object of the card file published by the Joint Committee on Powder Diffraction Standards. Ideally identification requires only the powder pattern, but any chemical information is helpful in choosing between two or more similar patterns. The convenient use of chemical information is provided for in both the Matthews coordinate index and the Johnson computer tapes. Wavelength-dispersive diffractometry provides no chemical information, but energy-dispersive diffractometry may provide positive evidence of the presence of certain elements, and, by implication, negative information about the absence of others.

Fukamachi, Hosoya & Terasaki (1973) have shown that interplanar distances can be measured by energy-dispersive diffractometry with a precision of about 0·01 %, which should be adequate for identification. Lauriat & Pério (1972) have noted that the pattern recorded will contain peaks corresponding to the characteristic radiations of the elements present in the specimen; whether these are actually observed will depend on the range of energies recorded and on the percentage of the element present. As noted by Wilson (1973), these characteristic-radiation peaks are distinguishable from the diffraction peaks because they have different line profiles. Provided that an adequate range of energies is recorded, therefore, a single energy-dispersive pattern should provide (i) the diffraction pattern necessary for entry to the JCPDS file; (ii) evidence of the presence of certain elements in the specimen; and (iii) the presumption that certain elements are not present in the specimen, since their characteristic radiations lie within the energy range recorded, and the corresponding peaks are not observed.

With regard to (ii), if characteristic radiations corresponding to the target element or the materials of the slit system of the diffractometer are observed, it can only be concluded that these elements are present in the specimen if the corresponding lines are absent from a pattern obtained under the same conditions with a specimen known not to contain the elements in question. With regard to (iii), if a characteristic radiation is not observed it does not indicate with certainty the absence of the element in question; the amount may be too small to be detected by the sensitivity of the arrangement, or the radiation may not have been excited because its excitation energy is greater that that of the short-wavelength limit of the continuous radiation from the X-ray tube. The escape peaks discussed by Fukamachi, Togawa & Hosoya (1973) may be confusing if their source is not recognized.

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