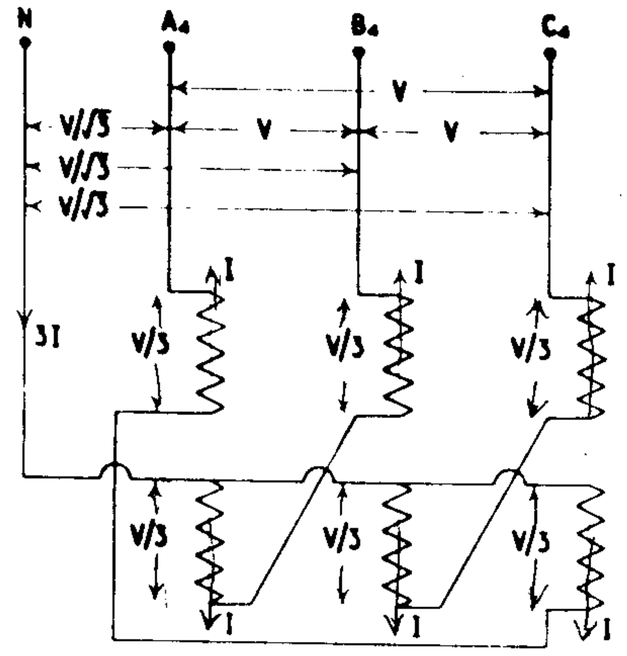

Figure 21.1 Three-phase, interconnected star neutral earthing transformer

halves of the windings on the same limb flow in opposite directions so that they introduce no choking effect, thus permitting a free flow of current from the earthing transformer neutral to each line wire. This, of course, is the reason for interconnecting the windings, as a star connection would produce an additional single-phase magnetic flux in each limb, which in turn would give exceedingly high single-phase voltages operating to reduce the fault current to values which would render the automatic protective gear inoperative.

With regard to the voltage distribution in the earthing transformer windings, it is interesting to see how this is disturbed from the normal, upon the occurrence of a single-phase earth fault. *Figure 21.3* shows the normal and the fault conditions in phasor form, assuming for simplicity that a short circuit occurs on phase A and that no earthing resistors are present.

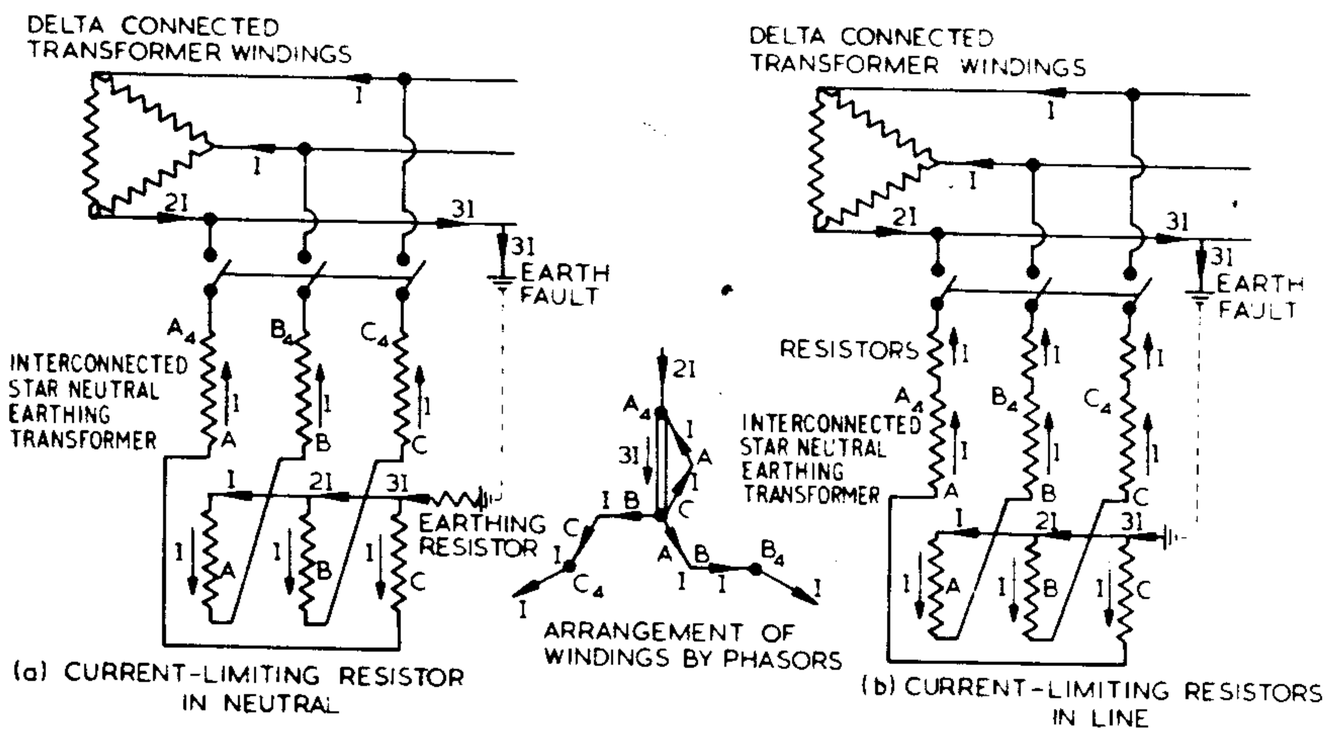

Figure 21.2 Interconnected star neutral earthing transformer. Arrows indicate instantaneous directions of fault currents