

## CHAPTER XXXV

### HEATING AND LIGHTING EFFECTS OF THE ELECTRIC CURRENT

**265. Heat Developed by an Electric Current.** In discussing the sources of heat (§ 129) we suggested an experiment to show that an electric current may be used to develop heat. The experiment illustrates a general principle. Whenever an electric current meets with resistance in a conductor, heat results. Now, as no body is a perfect conductor of electricity, a certain amount of the energy of the electric current is always transformed into heat energy.

**266. Practical Applications.** The heat produced by the electric current is applied in many useful ways. We have already referred to electric heaters and cookers (§ 129). Resistance wires and other forms of partial conductors heated by an electric current are used for various purposes, such as performing surgical operations, igniting fuses, heating furnaces, etc. In electric toasters and flat-irons the resistance wire is an alloy of nickel and chromium. This can be kept at red heat for weeks without injury, whereas an iron wire would soon deteriorate.



FIG. 272.- The incandescent lamp. *A*, carbon filament; *B*, conducting wires fused in glass; *C*, brass base to which one wire is soldered.

Rods of metal are welded by pressing them together with sufficient force while a strong current of electricity is passed through them. Heat is developed at the point of junction, where the resistance is the greatest, and the metals are softened and become welded together. But the most important application of the heating effects of the electric current is to be found in electric lighting.

**267. Incandescent Lamp.** The construction of the incandescent lamp in common use is shown in Fig. 272. A carbon filament, made by carbonizing a thread