Electricity Notes.

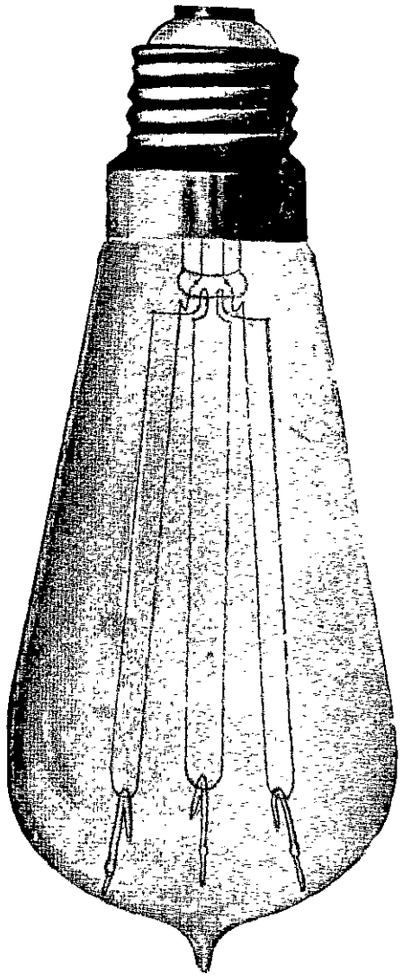
Electric Illumination.

Review of 1906.

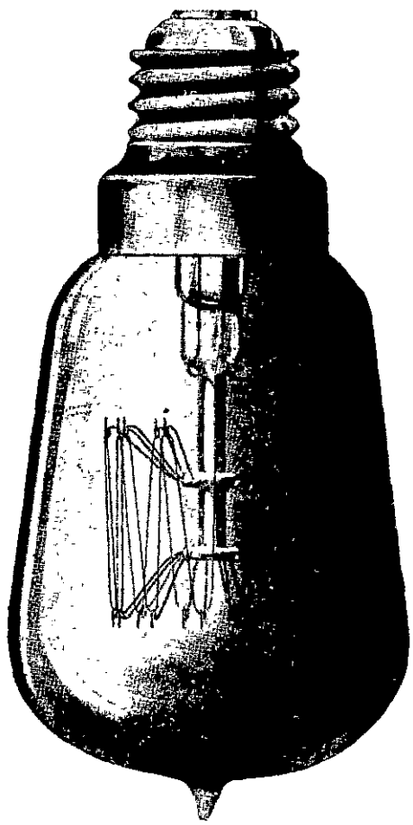
NEVER has greater interest been displayed in new methods of electric illumination than during the past year, 1906. If the promise held out by the inventors of metallic filament lamps are fulfilled we may soon witness the passing of the carbon filament bulb. Although the Nerst lamp, on which great hopes were based, because it only requires half as much current as the carbon filament, has proved too costly, and the osmium lamp has been found wanting for the same reason, and for the additional reason that its voltage of 47 is too low for ordinary circuits, the tantalum and tungsten lamps seem likely to be successors to the standard incandescent lamp. The tantalum consumes about as much energy as the osmium lamp, but its long filament renders its use possible on a 110-volt circuit, and on currents of even higher voltage. Its useful life of from 400 to 600 hours, and its maximum life of 1,000 hours and more, compare favourably with the best electric incandescent lamps in use. The filament is very delicate but able to stand greater variations than the carbon filament. When broken the ends readily fuse, so that the tantalum lamp's usefulness, although impaired, is not utterly destroyed. The present low cost of construction (50 cents) coupled with its high voltage, gives it a decided advantage over the osmium filament. Guelcher's irridium lamp is made only for low tensions (24 volts): it consumes, it is claimed, only 1 to 1.5 watts per candle power, and costs about 87 cents. What its life may be it is impossible to state, inasmuch as no figures have been published. It is open to many of the objections levelled at the osmium lamp. More promising is the tungsten lamp, which is now made by four European firms using as many different processes. The normal tungsten lamp of Just and Hannaman seems to give about thirty to forty candles at 110 volts and consumes 1.1 watts per candle. Kuzel's tungsten lamp is said to show an efficiency of 1 to 1.25 watts for 19 to 32 candle lamps with a useful life of 1,000 hours, at the end of which the loss in candle power is said to be but 10 or 15 per cent. When broken the filament automatically welds together as in the tantalum lamp. The osmium-tungsten lamps have shown from 1.026 to 1.047 watts per candle at 110 volts. Whether these new lamps will fulfil the new hopes placed on them can of course only be determined by thorough tests under conditions approximating those of actual service. At present the metallic filament lamp is in the experimental stage. The necessity of using the tungsten lamp in the inverted position may perhaps be regarded as a defect; yet quite recently the inverted gas mantle has invaded the extensive field hitherto monopolised by the electric light. —*Scientific American.*

The Tungsten Lamp.

The Wolfram or Tungsten incandescent lamp was put on the market about the end of last year. It is the invention of Dr. A. Just and Mr. F. Hanaman. In appearance and design it closely follows the lines of the familiar carbon filament lamp. These inventors were the first to make a tungsten filament, and their method of manufacture enables them, they claim, to make lamps commercially as low as 25 c.p. consuming one watt per candle,



TUNGSTEN OR WOLFRAM LAMP.



TANTALUM LAMP.

and with only three filaments. The life of the lamps is put at no less than 1,500 hours. The European manufacturers are bringing on the market a standard tungsten lamp of 40 hefners c.p. consuming 40 watts. After tests Professor Reithoffer of Vienna says, in his report of last January, "A like efficiency has never been reached by any incandescent lamp, this efficiency, in fact, very closely approximates that obtained by arc lamps, and indeed, seems to have reached the limit of what possibly can be achieved in incandescent lighting." These lamps burn well on direct as well as alternating currents, differing in this respect from the tantalum lamp, which does not stand up so well on alternating current as on direct. The filament in ordinary sizes is 17 inches in length.

The Tantalum Lamp.

Unlike the ordinary carbon spiral the filament of the tantalum is threaded up and down between two series of hooks arranged in circles, and connected with two terminals. This arrangement gives a large extent of glow and enables a more powerful distribution of light. Its chief merit, however, lies in the economy it effects. It consumes only half the current of a carbon arc of similiar voltage and candle power. When new its consumption is about 1.7 watts per candle power, as against 3.5 to 4 watts used by an ordinary lamp. It is claimed that its ordinary life is between 400 and 600 hours, but this is allowing considerable margin, as sometimes it endures for more than 1,000 hours. It is only where there are continuous circuits that full satisfaction can be obtained from the tantalum lamps, for, when on alternating circuits the results are somewhat irregular. Moreover, where local circuits run on 220 volts it is necessary to burn these in series, using two 110 volt lamps. The inventors claim that with these two minor restrictions, the tantalum lamp still has strong claims on the score of its efficiency and economy.

The above lamp was discussed at the last meeting of the Institute of Electric engineers, on which occasion it seems to have come in for a very large share of attention. The discussion was upon a paper by Mr. Swinburne on "Metallic Filament Lamps." Its scope may be gathered from the following letter published in a contemporary, which besides throws some interesting light on the tantalum and the work it has done already, as well as its position in the market, which is, after all, the proper practical test.

As there was not any opportunity to reply to several points raised by various members at the recent discussion at the institute on Mr. Swineburne's paper on "Metallic Filament Lamps," I should be grateful if you would allow me this opportunity of commenting on these points raised.

"I note that nearly every one who spoke discouragingly of the tantalum lamps has used them on alternating currents in distinct opposition to the makers' recommendation It is, therefore, scarcely surprising that the results they obtained were not encouraging. As one having experience extending over two years with the tantalum lamp, I beg to state there is no doubt that the makers' claims are more than justified if the lamps are used under fair conditions. The "pairing" of the lamps is a matter of great importance, and when this is given proper attention, and the lamps are installed of voltage sufficiently high to cover the fluctuations of the supply (a fairly large order in some circumstances), the average useful life of the lamps on direct current circuits comes out well above 750 hours