—*Cut courtesy Westinghouse.*

Engineering • Review

Tungsten Filaments

The above illustration shows the first step in the manufacture of filaments for electric light bulbs. That white powder is tungsten oxide; it's put into a hydrogen furnace and passed through an atmosphere of heated hydrogen for a period of three hours. During that time the hot gas extracts every trace of oxygen and moisture from the oxide, leaving pure metallic tungsten in powdered form. Then this powder is subjected to a pressure of fifteen tons—literally squeezed into solid metal.

The picture at the lower right shows the manufacture of diamond dies through which the tungsten is drawn into filament wire. Rough cut diamonds are set in brass casings and tiny, almost minute holes are drilled through them with the points of ordinary sewing needles which have been dipped in diamond dust. The dust acts as an abrasive, and is the only substance hard enough to cut the diamonds.

Such machines as the one shown are equipped to drill holes so tiny that they are nearly invisible to the naked eye. Often tungsten wire is drawn through these holes until it is several times as fine as human hair. These facts will give you some idea of the kind of filament that's used in your light bulbs.

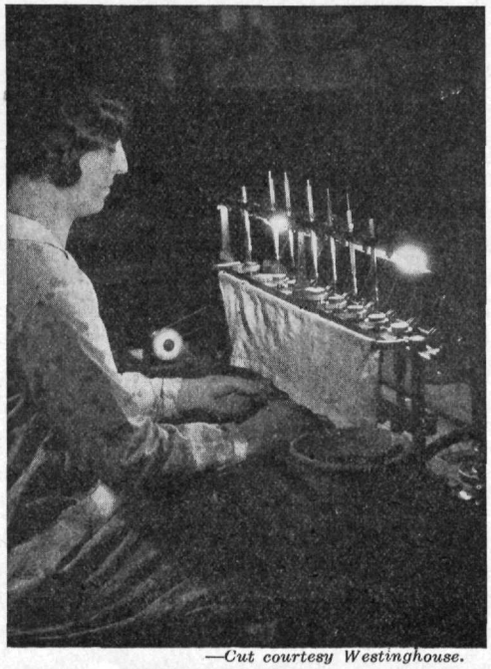
Lamp Saves Lives

Electrical Engineers have recently developed a new Christmas tree bulb which is expected to save two and one-half lives annually. It's filled with neon gas, and it glows with that familiar neon-red light after it has burned out, while the other lamps on the same string go dark. That makes it possible to find the defective lamp at a glance. Then it takes only a minute to change that lamp. Anyone who has traced burned-out lamps on a tree knows what a nuisance it is. Usually every bulb in the series must be tested individually, a procedure of at least five minutes.

Now, assuming that there are twenty million strings of Christmas tree lamps in use in this country, and that one lamp on each string burns out each year, the total time required to change those lamps would be around one hundred million minutes. Then, if these strings were equipped with this new detector lamp, the time for changing defective lamps would be reduced to one minute for each lamp or about twenty million minutes. One hundred million minutes is equivalent to 190 years; twenty million minutes equals about 38 years. That means that 152 years' time, or approximately two and one-half life spans would be saved each year.

Oscilloscope Analyzes Whiteman's Violin Tone

The "King of Jazz" recently underwent a severe test of his musical ability. Research engineers journeyed to Paul Whiteman's dressing room where they used an oscilloscope to check up on the "master of melody." The sound wave,



—*Cut courtesy Westinghouse.*
DRILLING DIAMOND DIES

The New cabin model of the
"flying windmill"---
The Pitcairn Cabin Model Autogiro

—Cut courtesy Aviation.

produced on the screen of the cathode ray oscilloscope by the popular bandmaster's violin tone, was exactly the same as a wave of a like tone which was known to be of perfect quality. Whiteman's ability as a musician was thereby proven and dubious engineers were satisfied.

"Topsy"?

Perhaps, like the famous Topsy of "Uncle Tom's Cabin," the British Thermal Unit was not born but fell off a cornstalk. At least its origin is unknown.

A gas company in Chicago recently wrote to the British Commercial Gas Association and inquired about the origin of the term. No answer could be found in the Association's files so the inquiry was handed on to the British Museum.

The Museum could offer no suggestions as to the origin but advised the inquirer to write to the Science Museum. Likewise they had no solution to offer. They informed the Chicago company that the term had been in use since 1883.

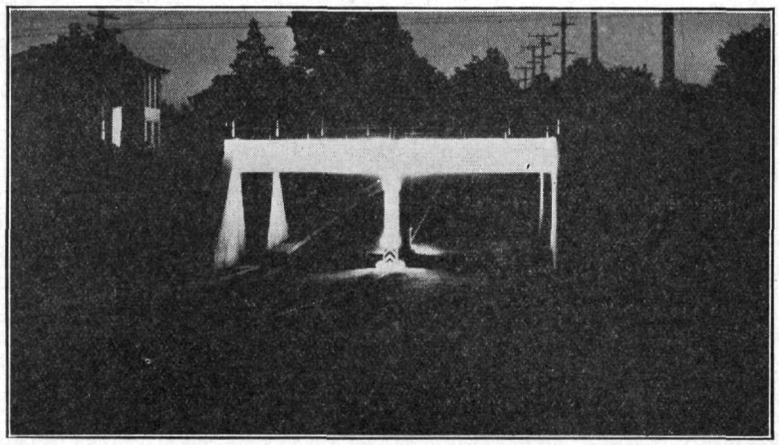
An inquiry was also sent to the Patent office. They replied that the term was used in a legal document as early as 1820. It was thought that the term has gradually evolved from the experiments of Lavosier and Laplace when a heat unit was adopted that would convert 1 gm. ice into water at 1° C. But, alas, the parents of this popular child are still unknown.

"Doughnut tires" are now being used for doughnuts! Bakers have found that by equipping their trucks with these oversize bounceeliminators their cakes and pastries are no longer jarred and bumped by poor roads, and are consequently delivered in much better condition.

Electrical Race Timing

The latest wrinkle in race timing uses the photoelectric tube to time the racers to a hundredth of a second. This apparatus eliminates the error resulting from human operation of the timing instruments, and the factor of optical illusion, which, however minute, are detrimental to the results when a fifth of a second may mean a new record.

The apparatus is really simple in operation. A microphone picks up the report of the starter's gun and trips a Thyratron tube relay, which immediately releases current to start an electric clock. A narrow beam of light is projected across the finish line and focused on a photoelectric tube; the first racer to cross the line interrupts this beam of light, and so stops the clock instantly. And there's your record, as accurate as anyone could wish.



An underpass on an Ohio highway---
Part of the Highway Department's
program to eliminate dangerous
grade crossings.

—Cut courtesy "Highway Topics"