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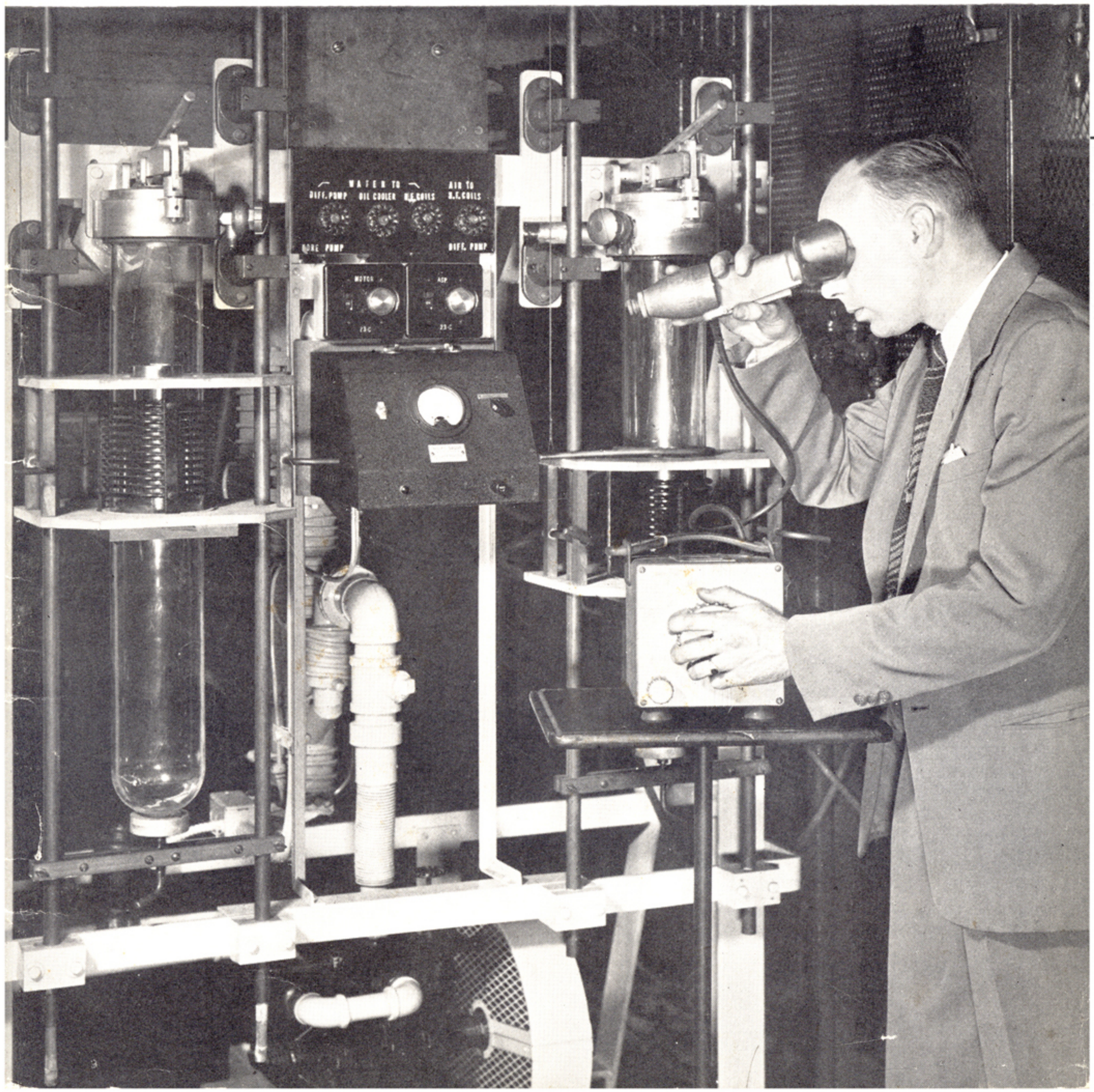

in connection with the 11,000-volt single-phase alternating-current system first employed, in 1907, by the New York, New Haven and Hartford Railroad Company in electrifying its line between New York City and Stamford, Connecticut. This system, without remedial measures, would have induced such high voltages on telephone lines in the vicinity of the railroad as to put them completely out of business. Beginning in 1905, and for several years thereafter, Mr. Barrett took an important part in the investigation of this problem, in the negotiations with the railroad company and with the Westinghouse Company, who were installing the system, and in planning the measures that led to its solution.

During his long period of service with the Bell System, Mr. Barrett was granted about thirty United States patents. The most important of these was his fundamental transposition patent, No. 392,775, already referred to. Others which seem worthy of special mention were No. 582,107, of May 4, 1897 (with G. W. Whittemore and W. M. Craft), covering a selective signaling system for telephone party lines; No. 736,672, of August 18, 1903 (with L. A. Falk and H. E. Shreeve), covering a lineman's handset which found considerable use; and No. 940,658, of November 23, 1909, covering means for neutralizing inductive disturbances on telephone lines caused by high-tension circuits.

The Cover: Inductively Heated Vacuum Furnace

The removal of gases dissolved or occluded in the structural components of electron tubes has always been an important step in their manufacture. Without such degassing, the gases evolve slowly during the life of the tube, and cause a variety of undesirable phenomena. General practice is to heat the parts in hydrogen, which reduces surface oxides and lowers the gas content. In the subsequent baking operation, associated with the pumping cycle, additional amounts of the gases originally present and the hydrogen introduced by the previous treatment are removed. The completeness of degassing is dependent upon such factors as the ratio of volume to area, the compactness of the parts, and the time and temperature of baking. With the advent of magnetrons and other ultra-high-frequency tubes having a preponderance of metal components, the existing methods of degassing proved inadequate. Studies seeking better methods indicated that degassing in a vacuum was a far more effective procedure, but a survey of furnace manufacturers revealed no equipment was available that would meet our requirements. As a result, a vacuum furnace was designed by F. J. Biondi of the Chemical Laboratories. Including a number of new features, it is arranged in a self-contained unit capable of completing an average degassing cycle in two hours—far less than had been possible with the limited apparatus previously available.

As shown in the illustration on the cover, this new degassing unit consists of two easily removable Vycor tubes thirty inches long by 4⅜ inches inside diameter, which are held against gaskets in the hinged metal tops by cranks mounted at the bottoms of the tubes. A coil of copper tubing surrounding each tube supplies the high-frequency heating power from an external source.* The coil is mounted in a counter-balanced frame that slides up and down to apply the heat to the suspended objects. Water is passed through the tubing to keep it cool, and the Vycor tubes are cooled by a stream of air. Parts to be degassed or otherwise treated are suspended on wires from a hook in the cover. An oil diffusion pump mounted between and behind the tubes is capable of reducing the pressure to 8 x 10^{-5} millimeters of mercury in six minutes. Besides being employed for degassing, the furnace has proved very useful for brazing, sintering, and other treatments of parts of electron tubes.

*Record, *August*, 1937, *page* 391.