

MASTER OF ENGINEERING

M. ENG.

ELECTRICAL

ROBERT AVERY CHIPMAN

ELECTRON OSCILLATIONS IN THERMIONIC VACUUM TUBES.

The generation of ultra-short electro-magnetic waves by oscillators whose operation depends primarily on an orderly motion of the electrons in the tube is discussed from a theoretical and an experimental point of view. A historical summary and detailed critical discussion is given of all the more important papers pertaining to the problem.

The experimental work is based on the determination of the oscillation characteristics of a vacuum tube by the method of working diagrams and space-models. Examples are given of misleading conclusions drawn from isolated two-dimensional characteristics, and the way in which this can be avoided by the determination of the complete characteristic of a tube is explained. It is recommended that mechanical theories of electron oscillations should be based only on information obtained from such a characteristic.

Miscellaneous experimental investigations of velocity of emission, wavelength control by external circuit, etc., are included.

M. ENG.

CIVIL

DELANO ERNEST EVANS

AN INVESTIGATION OF THE EFFECTS PRODUCED BY ELECTRIC ARC WELDING ON A STEEL COMPRESSION MEMBER

WITH

AN ANALYSIS OF THE DISTRIBUTION OF WELDING STRESSES IN STEEL PLATES.

Tests were performed on a welded and similar unwelded column to determine the effects of residual stresses, produced by welding, upon the load carrying capacity of a compression member. A measurement was made of the amount of shortening caused by the welding together with an estimate of the maximum initial stress in compression.

In the latter investigation, an analysis was made of the magnitudes and distribution of stresses produced by welding on steel plates. Four rectangular plates of the same length and thickness but of various widths, were welded along two opposite edges. The residual stresses were determined by cutting the plates into strips parallel to the welds and measuring the amounts by which the strips changed in length upon separation from the plates. The paper includes many charts and diagrams illustrating graphically the results from the investigation.

M. ENG.

ELECTRICAL

HENRIK WILHELM JADERHOLM

NOTES ON THE DESIGN OF BAND-PASS FILTERS.

A brief résumé of the theory of band-pass filters is given with particular attention to the contributions of Mallett, Pierce and Petrzilka.

Using the network (quadripole) theory as expounded by Strecker and Feldkeller, equivalent circuits are derived for typical coupling arrangements permitting an analysis of each case in terms of additive coupling coefficients. For the cases of series and parallel circuits, equations for the voltage amplification are found.

The maximization of these equations produces the desired relationship between the "peak separation", coupling coefficient and the ratio of circuit resistance to coil reactance.

To prove the theoretical conclusions a number of experimental peak separation measurements are compared to corresponding calculated values. Additional evidence is found from visual and photographic observations with a circuit analyzer, consisting of a cathode ray oscillograph and suitable sweep circuits.

M. ENG.

MINING

MICHAEL JEROME O'SHAUGHNESSY

A STUDY OF THE FACTORS AFFECTING GRINDING EFFICIENCY IN BALL MILLS.

The subject matter deals principally with the elimination or control of mechanical losses associated with a fine grinding plant. The investigation of certain phases of the operation has led to the development of new equipment. This includes a sampling device which continuously or intermittently samples quantitatively as well as qualitatively crushed rock pulps, and an automatic grease feeder for large bearings.