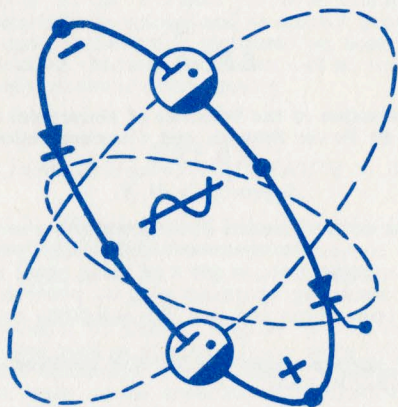


AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS



3RD JOINT CONFERENCE

RECTIFIERS



IN INDUSTRY

Sponsors: INDUSTRIAL POWER RECTIFIERS COMMITTEE
SEMICONDUCTOR RECTIFIERS COMMITTEE
COLUMBUS (Ohio) SECTION, AIEE

Time: *SEPTEMBER 18-19, 1962*

Place: DESHLER HILTON HOTEL, Columbus, Ohio

Theme: MORE EFFICIENT D-C THROUGH RECTIFIERS

Tuesday, September 18 — Continued

A more economical arrangement of rectifier equipment is described. The use of silicon power rectifier diodes in place of mercury arc rectifier tubes makes it possible to eliminate buildings and reduce expensive buss structures to a minimum.

12:00 Noon LUNCHEON

Tickets on sale at the registration desk.

2:00 P.M. SECOND SESSION STARTS Hall of Mirrors

Presiding Chairman, M. M. MORACK,
General Electric Co.

6. User Symposium: Operating Experience with Germanium and Silicon Power Rectifiers, in the Following Industries:

- A. Aluminum Smelting.
by C. A. LANGLOIS, Reynold Metals Co.
- B. Chlorine Production.
by WILBUR A. STELZER, Dow Chemical Co.
- C. Steel Strip Processing.
by WILLIAM R. WILSON, Inland Steel Co.
- D. D-c Shop Power Supplies.
by HARRY H. ANGEL, Bethlehem Steel Co.
- E. Mining Power Supplies.
by JOHN A. DUNN, Island Creek Coal Co.
- F. Transportation Power Supplies.
by JAMES STEWART, Chicago Transit Authority
- G. Telephone Central Station Battery Chargers.
by C. K. KNOWLTON, Bell Telephone Labs., Inc.

The experience gained in the various plants from the operation of germanium and silicon power rectifier equipment will be discussed at length. Good and bad features will be brought out. Recommendations for improvements will be brought out. A question and answer period will follow. The audience will be asked to participate in the discussion. The proceedings of this meeting will not be published.

BREAK

7. Protection of Silicon Power Rectifier Units

by W. R. HODGSON, Westinghouse Electric Corp.,
East Pittsburgh, Pa.

A thorough discussion of the coordinated protective systems for silicon power rectifier equipment which will bring out the different requirements for each application and the basis for selecting the proper protective devices.

5:00 P.M. End of Session

6:30 to 7:30 P.M. Hospitality Hour

7:30 to 9:30 P.M. BANQUET

Guest Speaker:

DR. G. D. CARSON, Vice-President,
Ohio State University, Columbus, Ohio

Tickets on sale at the registration desk.

Wednesday, September 19, 1962

8:00 to 9:00 A.M. Registration

9:00 A.M. THIRD SESSION STARTS Hall of Mirrors

Presiding Chairman, GLEN RAMSEY,
Fansteel Metallurgical Corp.

8. The Changing Configurations of Semiconductor Rectifiers

by W. H. HARMAN, JR. and I. K. DORTORT,
I-T-E Circuit Breaker Co., Philadelphia, Pa.

Semiconductor rectifier equipment of recent manufacture will be discussed to highlight such topics as sectionalization, regulating means, cooling methods, indoor versus outdoor construction in order to show the design trend for tomorrow's rectifier equipment.

9. Power Converters for Electroplating

by S. P. JACKSON, Solidstate Controls, Inc.,
Worthington, Ohio

A survey of the technical problems relating to such characteristics as voltage and its control, protection and D-c ripple, pertaining to electroplating applications will be discussed. Modern equipment will be reviewed with emphasis on newer developments.

BREAK

10. Use of Rectifiers in Detroit Edison Program for Eliminating Direct Current Network

by L. J. VANTUYL, Detroit Edison,
Detroit, Mich.

A discussion of Detroit Edison's D-c network and a three year plan to eliminate it, by using Silicon Power Rectifier equipment where required. Special emphasis will be made on the application of rectifiers to operate D-c elevators.

11. Measurement of Transient Junction Temperature of Silicon Rectifiers

by C. SMITH and C. STURTZEN,
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

A method of measuring junction temperature of silicon rectifier diodes while under load will be described. Test data and results obtained will be discussed.

12. Controlled Avalanche: A New Approach to Protecting Silicon Rectifier Diodes Against Voltage Transients

by F. W. GUTZWILLER, General Electric Co.,
Auburn, N. Y.

Following a review of the principal sources of voltage transients which can damage silicon power rectifying devices, a new approach is presented for determining the transient voltage capability of these devices and their protection.

12:00 Noon LUNCHEON

Tickets on sale at the registration desk.

2:00 P.M. FOURTH SESSION STARTS Hall of Mirrors

Presiding Chairman, J. A. MARSHALL,
General Electric Co.

Wednesday, September 19 — Continued

13. Modernization of Precipitator Power Equipment

by L. L. NAGEL, Buell Engineering Co.,
New York, N. Y.

A silicon rectifier assembly is described, which can be used to modernize old style electrostatic precipitator equipment using old style rectifying devices. Reasons for making the changes will be discussed.

14. Mercury Arc Converter Drives for the Algoma Parallel Flange Beam Mill

by D. W. BRISLAND, Algoma Steel Co., Canada
and D. E. BURKE and R. W. LYE,
Canadian General Electric Co., Canada

A review illustrating the latest techniques in the design, construction and performance of mercury arc rectifiers and inverters for reversing drive of a parallel-flange beam mill. The excitation circuits using solidstate devices and programming for automation will be discussed.

BREAK

15. Re-Evaluation of the Influence of Harmonics from Rectifiers on Power Systems and Communication Circuits

by R. P. STRATFORD, General Electric Co.,
Schenectady, N. Y.

Because of the wide use of semiconductors in new, large power conversion equipment and systems, the author has re-evaluated the practice of using phase multiplication, considering operation with no phase retardation, stiffer power lines and new TIF weighting curves.

16. Design and Operation of a 300 KW Tristor Controlled Rectifier

by W. S. ALBERT and F. V. Frola,
Westinghouse Electric Corp., East Pittsburgh, Pa.

Description of the control and power circuits and a discussion of the experience gained in operating a 300 KW, silicon controlled and regulated rectifier unit at 250 Volts D-c.

17. Static Inverters for New D-C Power Sources

by L. A. KILGORE, Westinghouse Electric Corp.,
East Pittsburgh, Pa.

New power sources such as fuel cells, thermoelectric, thermionic, magneto-hydrodynamic generators are being studied very intensively as power sources for the future. However they all generate D-c. The use of mercury arc and semiconductors as inverters for conversion to A-c is discussed, with such problems as motor starting and sub-harmonic resonance.

5:00 P.M. END OF CONFERENCE

DO NOT FORGET TO PURCHASE A COPY OF THE TRANSACTIONS OF THIS CONFERENCE, ON SALE AT THE REGISTRATION DESK.

REGISTRATION

The registration desk will be open as follows:
Monday, September 17, 1962. From 6:00 to 8:00 P.M.
Tuesday, September 18, 1962. From 7:30 to 9:00 A.M.
Wednesday, September 19, 1962. From 8:00 to 9:00 A.M.

The registration will be open on a limited basis during all sessions for your convenience and as a message center.

Tickets for the two luncheons and the banquet will be on sale. You are urged to indicate on registration form if you will attend the luncheons and banquet so that required arrangement can be made in advance with the Hotel.

Transactions of the meeting will be on sale as one bound volume containing all papers. The price for extra copies will be \$5.00 at the registration desk.

REGISTRATION FEES

Advance registration by mail will entitle registrants to reduced prices:

Members — \$9.00: includes registration fee and bound volume of conference proceedings.

Non-Members — \$10.00: includes registration fee and bound volume of conference proceedings.

Extra copies of Proceedings \$5.00 each.

Tickets for Luncheons and Banquet:

Banquet and luncheon tickets should be purchased by using the advance registration form attached. Prices for the two luncheon tickets will be \$3.00 each, banquet — \$5.00.

ADVANCE REGISTRATION

Please register by mail to avoid standing in line. For advance registration, make checks out to Mr. J. H. KALTENECKER and mail the check and registration card to:

MR. S. P. JACKSON,
Chairman Registration Committee,
Solidstate Controls, Inc.,
P.O. Box 164, Worthington, Ohio

Hotel reservations should be mailed directly to the DESHLER HILTON HOTEL, in Columbus, Ohio.

TRANSPORTATION

Columbus, Ohio can be reached by Air, Bus, Trains and private cars.

AIRLINES — American, Delta, Eastern, Lake Central, Piedmont, TWA and United.

BUS — Greyhound.

TRAINS — B & O, C & O, New York Central, N & W, and Pennsylvania.

HIGHWAYS — Routes 23, 33, 40, and 71.

NOTE: Limousine service is available between the airport and the hotel. Air ticket offices in the hotel lobby.

SPONSORING COMMITTEES

COLUMBUS (OHIO) SECTION, A.I.E.E.

W. Z. GINGRICH, *Chairman*
Ohio Bell Telephone Co.

INDUSTRIAL POWER RECTIFIERS COMMITTEE

H. M. MORACK, *Chairman*
General Electric Co.

SEMICONDUCTOR RECTIFIERS COMMITTEE

L. W. BURTON, *Chairman*
General Electric Co.

AIEE HEADQUARTERS, NEW YORK, N. Y.

R. S. GARDNER, *Secretary*
Special Technical Conferences

The Conference

These conferences are co-sponsored by two National AIEE committees, the INDUSTRIAL POWER RECTIFIERS COMMITTEE and the SEMICONDUCTOR RECTIFIERS COMMITTEE. All details of the conference are handled by a joint committee, known as the RECTIFIERS IN INDUSTRY COMMITTEE, and a Host Local Section of the AIEE which takes care of all the local arrangements. This year, the COLUMBUS (Ohio) SECTION of the AIEE is the Host.

The purpose of these AIEE conferences, held every five years, is to provide an all inclusive forum for the presentation and discussion of technical papers on RECTIFIER devices and equipment utilizing electronic tubes or semi-conductors as the rectifying devices.

The program has been planned to show the latest developments in the art and science of RECTIFIER device and equipment technology. It will review the state of the art as practised in the last five years, discuss the field experience obtained by the users of RECTIFIER equipment and attempt to forecast the future trends in the next five years.

Those in the audience, who are interested in furthering technical activities in the RECTIFIER field are urged to contact committee members and participate in the planning of future meetings. Technical papers for these future meetings are invited at this time.

Rectifiers in Industry Committee

- C. S. HAGUE, General Chairman,
Westinghouse Electric Corp.
- D. W. BORST, Program, *International Rectifier Corp.*
- R. S. GARDNER, AIEE Headquarters, New York
- W. Z. GINGRICH, Chairman Columbus Section, AIEE,
Ohio Bell Telephone Co.
- E. A. HARTY, Publicity, *Power Equipment Co.*
- S. P. JACKSON, Registration, *Solidstate Controls, Inc.*
- J. H. KALTENECKER, Secretary-Treasurer,
Ohio Bell Tel. Co.
- S. P. TOMESSEK, Local Arrangements,
The C & S Ohio Electric Co.
- R. V. WACHTER, Publications,
Aluminum Co. of America

Committee Meetings

Both the INDUSTRIAL POWER RECTIFIERS AND SEMICONDUCTOR RECTIFIERS committees will hold their regular fall meetings on Monday, the 17th of September 1962, at the DESHLER HILTON HOTEL in Columbus, Ohio. The time and location of the meeting rooms will be posted on the bulletin board.

Conference Program

Tuesday, September 18, 1962

7:30 to 9:00 A.M. Registration

9:00 A.M. Conference convenes in HALL OF MIRRORS

Address of Welcome:

W. Z. GINGRICH, Section Chairman,
Columbus Section, A.I.E.E., Ohio Bell Telephone Co.

Objectives of the Conference:

C. S. HAGUE, Chairman of Conference and
Rectifiers in Industry Committee,
Westinghouse Electric Corp.

9:15 A.M. FIRST SESSION STARTS

Presiding Chairman, R. D. LYNCH
Westinghouse Electric Corp.

1. Survey of Smaller Capacity Industrial Rectifier Equipment

by L. W. BURTON, General Electric Co.,
Philadelphia, Pa.

Currently offered general purpose power supplies, electroplating rectifiers, rectifier welders, battery chargers and power supplies to operate vacuum arc furnaces will be discussed with an emphasis on what is in store in the near future.

2. Semiconductor Power Rectifier Diodes and Controlled Rectifiers - Present Status and Future Possibilities

by D. W. BORST and E. J. DIEBOLD,
International Rectifier Corp., El Segundo, Calif.

A review of the past progress followed by a discussion of present design trends and possible future developments in the field of high power semiconductor rectifier diodes and controlled rectifiers.

BREAK

3. Survey of Power Applications of Semiconductor Controlled Rectifiers

by D. A. PISARICK, Westinghouse Electric Corp.,
Youngwood, Pa.

The advantages and limitations of SCR's when used in such applications as motor controls, ultrasonic power supplies and high power inverters will be discussed. Future efforts to extend the power and frequency handling capabilities as well as novel application areas will be also discussed.

4. Trends in Static Converter Development and Application in Europe

by L. W. MORTON, General Electric Co.,
Schenectady, N. Y.

A review of the extensive European applications being made today of both mercury arc and semiconductor equipment, with emphasis on applications of the SCR's.

5. The Rectoformer: A New Approach to Rectifier Installations

by A. P. COLAIACO and D. K. BARNES,
Westinghouse Electric Corp., East Pittsburgh, Pa.