
WESTINGHOUSE
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DESCRIPTIVE SPECIFICATION

WESTINGHOUSE

50-HG-1

50 KILOWATT BROADCAST

TRANSMITTER

Westinghouse Electric Corporation
Radio Division Baltimore, Maryland

May 16, 1946

R-1535-1

Descriptive Specification

Westinghouse 50-HG-1

50 K. W. Broadcast Transmitter

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Descriptive Specification

Westinghouse 50-HG-1

50 KW Broadcast Transmitter

I. General Introduction

This modern radio transmitting equipment embodies advanced design features resulting in distinct improvements over other apparatus now in general use. The operating characteristics, arrangement of parts, ease of maintenance, and appearance of the equipment assures it an outstanding place among broadcast apparatus. (See Photo C-7144.)

Some of the distinct advantages which make this equipment outstanding are:

1. Air cooled tubes in all stages.
2. Extremely low operating cost.
3. Metal rectifiers throughout, except main high voltage rectifier.
4. Inductive neutralization of the power amplifier.
5. Equalized feedback in audio system.
6. Variable compressed gas capacitors.
7. Complete fuseless overload protection.
8. A spare rectifier tube maintained at operating temperature and instantly available for use.
9. Ease of adjustment.
10. Unit construction throughout.
11. Relatively low plate voltages.
12. Conservative operation of all tubes.
13. Complete supervisory control.
14. Dry-type transformers, reactors, and regulators.
15. True cubicle construction.
16. Individual voltage regular for all filaments and low voltage supplies.
17. Individual voltage regulator for main rectifier.

The use of air-cooled tubes eliminates water jackets, pumps, cooling radiators, water storage tanks, distilled water and all other attendant inconveniences of expensive installation and maintenance inherent to equipments employing water-cooled tubes.

Inductive neutralization as used in the power amplifier when once adjusted for a given operating frequency requires no further readjustment.

The inherent high-fidelity of the audio and modulation circuits and the low distortion obtained are supplemented by an equalized feedback system. No complicated adjustments or circuits are used to obtain the optimum overall performance over a wide range of operating conditions. Low distortion and excellent audio frequency response

under all operating conditions are thus assured.

Compressed gas capacitors are used in the driver and power amplifier stages. They provide high capacitance, wide range of tuning, short leads, low losses, and complete shielding with minimum space requirements. This contributes to the efficient, compact overall design.

Continuously variable coupling, with controls mounted on the front panel, is employed between the 1 KW driver and the final power amplifier. Tapped inductances and wide range variable capacitors in all radio frequency amplifier stages contribute to simplicity of adjustment and operation. The inherent non-critical adjustment and wide range of allowable loading of the Class C amplifier result in extremely easy adjustment and stable operation. All bias, filament, and plate voltages except the main plate voltage are adjusted by one simple control, located in the power control unit. The main rectifier plate voltage is controlled from the power amplifier unit. These controls operate the voltage regulators in the distribution and main rectifier power circuits respectively. To assist in balancing tube currents, auxiliary adjustment of individual audio bias voltages may be made with controls located on the front panel. However, in normal operation, only the one master control is used.

All tubes are operated well below their rating with resultant long life and economical operation. The power amplifier tubes have filaments designed for 10,000 hours life assuring low per hour tube cost.

IIa. Electrical Performance Characteristics

1.	Carrier Power Output	50,000 watts
2.	Carrier Frequency Range	(single specified freq.) 540-1600 KC
3.	Power Supply	2300 volt, 3 phase, 60 cycle
4.	Power Input for 50 KW Carrier	105 KW without modulation 113 KW with average modulation 145 KW with 100% modulation (sine wave) Power factor approximately 90%
5.	Frequency stability	Within ± 10 cycles
6.	Modulation Capability	100%
7.	Frequency Response	Uniform within less than ± 1 db. 30 to 10,000 cycles
8.	Audio Distortion	Less than 3% r.m.s. from 0 to 95% modulation 50 to 7500 cycles

9.	Speech Input Level	+8 DBM for 100% modulation
10.	Carrier Noise and Hum Level	At least 60 db. below 100% modulation
11.	Overall Efficiency	47.5% Final stage over 80% plate efficiency
12.	Harmonic Radiation	None greater than 70 db. below fundamental
13.	Tube Complement:	

Stage	Tubes
Crystal Oscillator	2 - Type 802, 1 each 2 - Type VR150, 1 each
Buffer Amplifier	1 - Type 807
Int. Amplifier	1 - Type 803
Driver Amplifier	2 - Type 833
Power Amplifier	2 - Type 895AR
1st Audio Amplifier	2 - Type 6J7
2nd Audio Amplifier	2 - Type 807
3rd Audio Amplifier	2 - Type 828
4th Audio Amplifier	2 - Type 849
Dynatron Suppressors	2 - Type 807
Modulator	2 - Type 893AR
Main Rectifier	6 - Type 857B

IIb. Mechanical Data

1 KW Exciter Unit	48" wide, 54" deep, 84" high
Modulator Unit	48" wide, 54" deep, 84" high
Power Amplifier	144" wide, 54" deep, 84" high (composed of three cubicles, each 48" wide)
Power Distribution Unit	48" wide, 54" deep, 84" high
Power Control Unit	48" wide, 54" deep, 84" high
Rectifier Unit	48" wide, 54" deep, 84" high
Weight per cubicle	Approximately 4000 lbs.
Floor area for above units	33-1/4 ft. x 4-1/2 ft.
Clearance for doors	4 ft. on front & 2-1/2 ft. on rear
Modulation Transformer	78-7/8" high, 56" wide, 46-1/2" deep Weight - 4750 lbs.

Heising Choke	40" wide x 68" high x 30" deep Weight - 2500 lbs.
Main Rectifier Plate Transformer (3 single phase)	Each 37" wide x 55" high x 27" deep Weight - 1400 lbs.
Filter Choke	16" wide x 27" high x 20" deep Weight - 440 lbs.
37.5 kv-a Main Rectifier Regulator	26-1/2" wide x 70-7/8" high x 30-1/2 deep Weight - 3900 lbs.
22.5 kv-a Distribution Regulator	24-1/4" wide x 58-1/8" high x 26-1/4" deep Weight - 2000 lbs.
15 kv-a Distribution Transformers (3 required)	15-3/4" wide x 25-5/8" high x 19-7/8" deep Weight - 240 lbs.

Each cubicle is a completely shielded unit. Front and rear doors, as well as access doors to interior compartments, are electrically interlocked wherever the door permits access to parts at dangerous potentials. The front and rear door interlocks remove all voltages above 230 V. from the cubicle when an interlocked door is opened. The access door interlocks when open prevent the application of filament, bias or plate power as these doors affect the distribution of cooling air in the cubicle, in addition to electrically shielding some of the circuit components.

Front doors covering compartments containing tuning or control adjustments are not interlocked, as all controls are at ground potential.

All cubicles are finished identically in durable two-tone grey lacquer, with chrome trimming.

III. General Description

The complete transmitting equipment is composed of the following standard units: (For special units and accessories see Section IV, Page 22, of this specification.)

a. 1 KW Exciter Cubicle
b. Modulator Cubicle
c. Power Amplifier, consisting of 3 cubicles
d. Power Distribution Cubicle
e. Power Control Cubicle
f. Main Rectifier Cubicle
g. Power Transformers and Regulators, Modulation Transformer, Heising Choke, and Filter Reactor
h. 2 blowers, including motors
i. Tubes
j. 2 instruction books

The transmitter proper, as usually installed in a station, is composed of the 1 KW Exciter, Modulator, Power Amplifier, Main Rectifier, Power Distribution and Power Control Cubicles, mounted in line and directly adjacent as shown in photograph C-7144. The space required is 33-1/4 feet, of which 1 foot is the end trim to overlap the wall. The unit construction of the equipment permits other arrangement to suit the particular installation.

The complete equipment when installed requires only a 2300 volt, 3 phase, 60 cycle power source, plus 115 V AC for crystal heaters, and a program source at a level of +8 DBM from a 600/150 ohm line, to deliver full rated power into a suitable transmission line and antenna system.

No rotating power equipment is used. All filaments are heated by alternating current. Multiphase filaments in the modulator and power amplifier tubes assure a minimum of residual modulation from the tube filaments.

All front and rear compartment doors to tube or power compartments are electrically interlocked to protect personnel from accidental contact with high voltage circuits. When the door is opened, the interlock removes all high voltage from the cubicle. All controls, switches, etc., manipulated during operation are of the dead front type. All panel-mounted instrument cases are grounded, and the circuits associated with such instruments in no case operate at potentials more than 130 volts from ground potential.

Interlocks in the control system maintain proper sequence in the application of power when control is automatic and prevent improper sequence when manual or semi-automatic control is used.

Every precaution, consistent with good engineering and operating practice, has been taken throughout to assure safety to both personnel and equipment.

An air duct approximately 3-1/2 feet square must be run above and below the transmitter units to supply the ventilation for the equipment. Air is introduced at the bottom of each cubicle from the lower air duct and is collected in the upper air duct. The heated air may be exhausted outside of the building, or in cold weather it may be used to heat the transmitter building. The air entrance, on each cubicle, is equipped with an air operated interlock, which prevents the application of power unless adequate air circulation is available.

The transmitter and rectifier units are finished in durable two-tone grey lacquer with chrome trimmings, thus presenting an unusually impressive appearance.

For dimensions of all units refer to section IIb.

IIIa. 1 KW Exciter Unit

The right half of the exciter unit contains tubes and circuit components for all the R.F. stages, except the power amplifier. The left half contains the tube and circuit components for all the audio frequency stages, except the modulator.

Photograph C-4966 shows the front of this unit with the front compartment doors open. The upper and lower doors are electrically interlocked.

The lower right portion of the cubicle contains two crystal oscillators each complete with its Type 802 tube and Type VR-150-30 tube, Type TMV-129B crystal and holder, and circuit components. These units are individually shielded from stray R.F. fields. Either unit may be selected to operate with the transmitter by means of a selector switch, mounted on the exciter unit control panel, which applies plate voltage and connects the excitation from the unit selected to the buffer amplifier. The crystals are maintained at a constant temperature of 60° C. In addition, the crystals are V-cut having a very low temperature coefficient. Electron coupling from the crystal oscillator circuit to the buffer amplifier grid isolates the crystal from variation in loading.

The crystal oscillators receive plate and screen voltage from the 400-volt metal rectifier, located in the exciter unit. The screen potential is additionally regulated by means of the VR-150 voltage regulator tube. This assures constant voltage to the crystal oscillating circuit and assists in maintaining constant frequency under all operating conditions.

Above the crystal oscillator unit are mounted the buffer and intermediate amplifier stages. The buffer amplifier stage uses a type 807 tube operating at a plate voltage of 400. The intermediate amplifier uses a type 803 tube operating at a plate voltage of 1250 volts, obtained from the 1500 volt rectifier mounted in the power control unit. The circuit components for these stages are adequately isolated from each other and subsequent stages by shields and appropriate arrangement of parts. A coupling terminal from the tank circuit of the intermediate amplifier is supplied for operation of a frequency monitor.

The type 803 tube supplies excitation for the driver amplifier which uses two type 833 tubes operating in push-pull. The type 833 tubes obtain plate power from the 3000 volt metal rectifier mounted in the power control unit. These tubes are neutralized by the conventional capacity method, and after the initial adjustment, tube changes can be made without further adjustment. This stage is located in the upper right portion of the exciter unit. Variable coupling, controllable from the front of the unit, permits proper adjustment of excitation and loading.

In the lower left of the exciter unit are the 1st and 2nd audio amplifiers consisting of two type 6J7 and two type 807 tubes operating in push-pull and resistance coupled to the following stages. All associated circuit components are adequately shielded. Plate power is obtained from the 400 and 1500 volt metal rectifiers.

Directly above is located the 3rd audio amplifier using two type 828 tubes in push-pull. This stage is resistance and impedance coupled to the following stage. Plate power is obtained from the 1500 volt rectifier.

In the upper left are located the two type 849 tubes of the 4th audio amplifier, operating push-pull. This stage operates Class "AB" and is direct coupled to the modulator. Plate power is obtained from the 3000 V. rectifier. The doors covering the tube compartments are electrically interlocked to remove all high voltage from the unit. The cathode loading used in this stage provides a low impedance source to drive the modulator.

In the middle portion of the unit is the exciter control panel on which are located tuning and adjustment controls, instruments and switches for the adjustment and operation of the exciter unit.

From left to right the control knobs are 4th audio amplifier bias (left and right), modulator bias (left and right), buffer tuning, intermediate amplifier tuning, input coupling to driver amplifier, grid tuning for driver amplifier, right and left driver amplifier plate tuning, driver amplifier output coupling and crystal selector switch.

Directly below the controls are a row of Westinghouse Type VX33, 2-1/2" flush mounted instruments. Ammeters are provided to indicate plate current for each tube of all audio and radio frequency stages, except the 1st and 2nd audio amplifiers. Grid current ammeters are supplied for the 4th audio amplifier tubes and all R.F. amplifier tubes except the buffer amplifier tube. Voltmeters are supplied to indicate the voltage supplied by the 300 volt bias and 400 volt plate rectifiers. The instruments are logically arranged and adequate in number to permit correct adjustment and operation of the equipment.

Below the instruments are switches controlling the 400 volt plate rectifier, 1500 volt plate rectifier, 4th audio amplifier bias rectifier, modulator bias rectifier, 3000 volt plate rectifier and crystal heater circuits, #1 and #2. Adjacent to each switch (except crystal heaters) are two indicating lights; one green which indicates that the switches associated with the circuit are closed, and one red which indicates that the associated circuit is energized. The lights adjacent to the two crystal heater switches are: one clear to indicate the operation of the thermal relay, and one red to indicate that power is available for the heater circuit.

The door covering the controls and instruments is not interlocked. Suitable nameplates are mounted adjacent to controls, instruments,

and switches to permit intelligent operation.

When all doors in the cubicle are closed, adequate indication of normal operation is given by the row of square Westinghouse type KY instruments across the top of the front panel and the row of indicator lamps mounted on the upper door. The four instruments from left to right indicate 4th audio amplifier plate currents (left and right), and R.F. driver amplifier plate currents (left and right). These instruments are indirectly lighted.

The seven indicator lamps on the upper door indicate air flow filament voltage, 400 volt rectifier, 1500 volt rectifier, 4th audio amplifier bias rectifier (left and right) and 3000 volt rectifier.

The rear of the 1 KW exciter cubicle (with the rear compartment door open) is shown in photo C-4969. The left portion (rear view) contains the transformers, filters, overload relays, etc., associated with the R.F. amplifier stages. The right portion contains the equipment associated with the audio amplifier stages. The rectifiers for 400 volt plate supply and 300 volt bias supplies are located in the bottom of the cubicle and are of the metal rectifier type. Rectifiers of this type, first introduced by Westinghouse for high voltage, high current applications in broadcast transmitters, have practically unlimited service life. Transformers, capacitors, reactors, and resistors are of adequate rating to assure reliable operation over years of service. All parts are conveniently accessible.

IIIb. Modulator

The modulator contains the mountings for four type 893AR tubes (2 active and 2 spares) and filament transformers.

The two type 893AR tubes operate in push-pull class "B" and obtain plate power from the main rectifier.

The 893AR tube is a high power tube of the air-cooled type. The development of high power air-cooled tubes has been carried on by Westinghouse engineers over a period of years. They have been used in commercial applications with excellent results. Their reliability has been established in stations operated by the Westinghouse Electric Corporation.

Individual bias rectifiers (located in the exciter unit) supply bias for the modulator tubes. The individual bias rectifiers facilitate "balancing" the modulator tubes.

Photo C-4963 shows the excellent arrangement of parts, permitting maximum accessibility. The filament transformers at the top of the unit (one for each tube) are of the three phase, constant current type. This design protects the tubes during the initial application of filament voltage, limiting the filament current to a safe value.

Located on the left and right hand side of the modulator are two 807 Dynatron Suppressors. These are used to eliminate the dynatron effect common in most high power vacuum tubes.

In the compartment below the tubes are located the plate resistors which are used in the equalized feed-back circuit. The access door to this lower compartment is electrically interlocked preventing the application of filament voltage until closed, to avoid damage to tubes by accidental by-passing of cooling air.

Filament switches permit rapid tube transfer in case of failure during program. Individual filament switches for the modulator tubes are mounted in the power control panel. These switches are in the primary circuits of the filament transformers. In case of a failure, the offending tube can be quickly isolated by removing its grid and plate resistors. The defective tube can then be removed and replaced during the next maintenance period.

The compartment doors on the front and rear of this cubicle are electrically interlocked removing all potentials above 230 volts from the unit when opened.

The four Westinghouse Type KX instruments across the top panel indicate plate current (left tube) and 807 suppressor cathode current; plate current (right tube) and 807 suppressor cathode current respectively. These instruments are indirectly lighted.

The instrument on the door in conjunction with a selector switch indicates the filament voltage on each phase of the modulator tubes. The signal lamps indicate the application of air, filament, bias (left), bias (right), and main rectifier respectively, left to right. This provides adequate indication to facilitate operation and maintenance of this unit.

The modulation transformer is mounted external to the modulator unit. In most installations, this transformer is mounted in the same enclosure as the power transformers and voltage regulators, or arrangement as per installation.

IIIc. Power Amplifier

The power amplifier is excited by the driver amplifier by means of two RG-19U coaxial transmission lines connected between the output circuit of the driver amplifier and the tuned grid circuits of the power amplifier. The power amplifier uses two type WL-895AR tubes in push-pull, one located in each of the side cubicles. Additional mountings are provided for a spare tube in each cubicle. These tubes are similar in appearance to the type 893AR tubes used in the modulator, but are designed for higher power. The power amplifier is composed of three cubicles.

The center cubicle contains the main tank and antenna coupling circuit as well as the controls for adjusting the various circuits. Individual controls for each half of the power amplifier facilitate the balancing of excitation and loading. The units to the left and right of this center cubicle each contain one active and one spare power amplifier tube with associated power and tuning components. The right and left hand cubicles are identical in design except for the right and left hand arrangement of parts to maintain symmetry of circuits about the central unit.

Photo C-4645 shows a front view of the center cubicle with the front compartment door open. The tuning controls are symmetrically arranged for the right and left tube compartments. This door is not interlocked, as all controls are of the "dead-front" type and all instruments and relays are at substantially ground potential.

From bottom to top along the left side of the panel are the grid tuning and plate tuning controls for the left half of the power amplifier circuits. The controls along the right edge of the panel are the equivalent controls for the right half of the circuits. The Westinghouse Type RA-35 instruments adjacent to the grid tuning controls are the power amplifier grid capacity indicators, which give the approximate condenser position in mmfd. Each condenser is driven by an electric motor controlled from this position. Those instruments adjacent to the plate tuning are the power amplifier plate capacity indicators. Plate overload and bias under voltage relays are mounted across the top of the panel. Individual overload relays are supplied for each P.A. tube cubicle.

The two upper instruments in the center of the panel indicate the plate current for each half of the P.A.

The two lower instruments indicate the left and right P.A. grid current.

The controls and lamps in the center are (left to right) as follows:

P.A. bias switch and indicator lamp.

P.A. plate voltage "lower" (manual) switch and regulator "low" indicator lamp.

"Manual-automatic" plate voltage control switch.

P.A. plate voltage "raise" (manual) switch and regulator "high" indicator lamp.

P.A. plate voltage switch and indicator lamp.

The manual plate voltage controls which control the main rectifier voltage regulator are operative only when the "manual-automatic" switch is in the "manual" position.

When set for automatic operation, the plate voltage is maintained at the value determined by the adjustment of the primary relay on the voltage regulator.

Suitable nameplates mounted adjacent to each control identify the controls, thus facilitating correct operation. Three instruments across the top of the unit are Westinghouse Type KX, 25 series, indirectly lighted, and indicate R.F. antenna current, P.A. voltage and total P.A. plate current respectively, left to right. In stations employing directional antennas a transmission line ammeter can be supplied instead of the antenna ammeter.

The indicator lamps on the front door are for plate voltage and air, filament and bias for the right and left tube cubicles.

The rear of the center cubicle is shown in photo C-4971. The lower compartment contains the power amplifier tank inductance and antenna coupling coil. These coils are ceramic insulated and wound with copper tubing. Two pick-up coils for operation of the modulation monitor and diode monitor are provided. The diode monitor is designed to deliver an audio output between 0 and +6 DBM (between 1 and 4 milliwatts) at 95% modulation into a resistance of 600 ohms. This monitor employes a 1N34 crystal diode and the necessary filter network to remove the RF component. The tank coil is completely shielded.

Space is provided in the upper compartment for the antenna line termination network. This line termination network will be engineered to suit the requirements of any particular installation, and thus is not a standard part of the equipment herein described.

The antenna arc interrupter unit is for the purpose of interrupting any arc that may form in the antenna system as a result of lightning or other causes. When an arc occurs, an unbalance occurs in the system and the unit acts on this unbalance to momentarily cut the transmitter carrier thus extinguishing the arc. The entire operation is automatic and may be adjusted to work with any antenna systems, both directional and non-directional. The system protects the antenna against guy wire arcs which may be in danger to the safety of the antenna mast.

The unit operates from 110 V. A.C. and mounts in a standard audio rack with a 8-3/4" high panel.

Photograph 296248 shows the rear view of the right hand power amplifier cubicle. As the left and right units are alike only one will be described in detail. As shown in photograph 296248, the two type WL-895AR tubes (one spare) are mounted near the front of the unit, with filament transformers directly over each tube. These transformers are of the constant current type similar to those used in the modulator, except of higher rating. The convenient transfer of tubes is accomplished in a manner similar to that

described for the modulator tubes.

In the center of the top is located the tuned grid circuit. The gas filled grid tuning capacitor mounts just in front of the grid inductance. Auxiliary grid leak bias in addition to the fixed bias from the bias rectifier is supplied by the grid resistors mounted at the upper left. The electric tuning drives are mounted on the cubicle wall near each capacitor.

In the middle just to the rear of the tubes is the neutralizing inductance with its associated blocking capacitor. The large capacitor, on which the neutralizing inductance is mounted, is the plate blocking capacitor. The large gas-filled variable capacitor on the shelf permits convenient adjustment of the plate circuit tuning. The large bowl insulators support the circuit leads where they pass into adjacent compartments.

On the tube shelf opposite the variable capacitor is mounted the P.A. bias rectifier. This rectifier is of the metal type with air-blast cooling. The rectifier has a nominal rating of 400 volts, 0.5 amperes, and the rectifier elements are the same as used in the 400 volt rectifier of the exciter unit. The bias rectifier transformer and filter are mounted in the compartment below the tube shelf.

The power amplifier plate choke is mounted in the compartment underneath the tubes. Convenient access is gained to the choke through the access door on the rear of this lower compartment.

Across the top panel of each of the power amplifier tube cubicles are three Westinghouse type KX 25 series indirectly lighted instruments, indicating the plate current, grid current, and grid bias for the tube in that cubicle. On each front door is mounted a filament voltmeter and switch for the power amplifier tubes.

The tuning capacitors are operated from the controls on the panel in the center cubicle.

The power amplifier is plate modulated, the normal D.C. plate voltage being 11,000 volts. Modulation is supplied from the modulation transformer through a coupling capacitor to the Heising choke which is in the plate circuit of the power amplifier.

The use of high level modulation facilitates the adjustment of the power amplifier for maximum efficiency at all times. Output can be varied without destroying the efficiency or fidelity of transmission, and without resorting to complicated engineering adjustments.

The coupling coil permits convenient impedance match to various types of R.F. transmission lines having impedances of from 70 to 400 ohms. It can be used with a coaxial type transmission line with one side grounded, or with an open wire line, neither side grounded.

IIId. Power Distribution Unit

The power distribution unit contains two main manually operated electrically tripped, overload oil breakers and two electrically operated oil contactors in addition to various auxiliary power apparatus incident to metering the power line, the power distribution bus, etc.

A front view of this unit with the front compartment door open is shown on photo C-5114. The switch on the left is the power distribution oil breaker, Westinghouse Type F-11. This is in the primary of the circuit supplying all transmitter power, including blowers, except that taken by the main rectifier plate transformer.

The breaker on the right is another Westinghouse type F-11 oil breaker and is in the circuit to the main rectifier plate transformer. This breaker is supplied with an inverse time delay overload release, and permits the automatic overload and reset relays to clear momentary overloads. Only a very heavy or sustained overload on the main rectifier will operate this breaker.

The two rotary switches above the oil breakers are the voltmeter and ammeter switches which permit measuring phase currents and voltage on the A.C. ammeter and voltmeter. The instrument between the breakers is the tube life meter. The four Westinghouse type KX, indirectly lighted instruments across the top of this unit indicate A.C. line volts (used in conjunction with switch), transmitter kilowatts from line, A.C., line currents (used in conjunction with switch), and distribution bus voltage. The meters on the door are time clocks which indicate the time and duration of a carrier break.

Photo C-4559 shows the interior of the power distribution unit. Current and potential transformers are mounted in the bottom of the unit. These are used in conjunction with the wattmeter, ammeter and voltmeter on the front of the unit, the main rectifier A.C. overload relays, and the F-11 circuit breaker trip circuits.

The two oil breakers at the front of the unit are the two Westinghouse Type F-11 oil breakers in the power distribution and rectifier primary circuits.

The two Westinghouse type 35-FO-5 oil contactors just behind the F-11 breakers are the main rectifier start and run contactors. The main rectifier always starts at reduced voltage for a few cycles, a resistor being placed in each primary leg of the main rectifier voltage regulator. This resistance is then shorted out by the second contactor, applying normal voltage to the rectifier. This step-start feature reduces surges caused by the initial charging current of the rectifier filter capacitors. At the top of the unit are the resistors used in the step-start circuit.

Each F-11 breaker is equipped with a cylinder lock which trips the breaker and locks it out when the key is turned to the position in which the key can be removed.

In a typical installation, the two keys from the breakers in the power distribution unit fit two cylinder locks on the entrance breaker switch (supplied by power company or customer) operating shaft. The entrance breaker cannot be opened until both of the locks have been operated by their keys. With this switch in the open position both keys may be turned, locking the switch open and freeing the keys so that the disconnects may be operated.

With the switch in the open position a third key may be removed, locking the switch open. This key fits into a key changer, which frees two keys fitting the rear doors of the power distribution unit and transformer vault.

In reversing the operation, the transformer vault and rear door of the power distribution unit must be locked to free the keys, which in turn release the key which operates the third lock on the breaker shaft. With this lock unlocked, the breaker can be operated, when the two keys from the disconnects have unlocked the other two locks on the breaker shaft.

These two locks may now be operated to lock the breaker closed. With the breaker locked closed, the two F-11 breaker keys may be removed and the two F-11 breakers in the power distribution closed.

The third key on the power breaker shaft cannot be removed except in the open position of the breaker.

IIIe. Power Control Unit

The power control unit shown in photograph C-5115 contains De-ion switches for all the primary circuits of the transmitter auxiliaries, master overload relays, and the supervisory control system. The 1500 volt and 3000 volt D.C. metal rectifiers are mounted in this unit.

The control system has been designed to be as fool-proof as possible. All compartments containing dangerous voltages are protected to prevent accidental contact with these circuits. All doors which would permit access to these compartments are interlocked, to remove power if opened. In addition, the equipment is protected by removal of plate power if bias fails, removal of filament, bias and plate voltages in case of air failure, etc. The control circuit is interlocked so that it is impossible to apply power in the wrong sequence. Under automatic operation, the sequence is properly timed for safety to tubes and equipment. Interruption of the normal sequence at any point blocks the succeeding operations. Sufficient indicators are provided to designate the point at which the sequence has stopped. This facilitates locating trouble. It also permits the operator to stop the operation at any particular point, to make adjustment or

checks on proceeding stages.

Overload and under-voltage protection is supplied in all circuits where necessary. In case of overloads, the transmitter is removed from the air momentarily, permitting the overload relay to reset, and then power is reapplied automatically. If the overload still exists, this is *repeated two times; then the transmitter is removed from the air for 5 seconds, and power reapplied. If the overload still exists the above sequence is repeated until the overload is cleared or the equipment is turned off manually. If the lockout switch on the control panel is set to the lockout position, the transmitter will stay off after the initial three* tries until released by the operator. If the overload has cleared after the first or second try the overload counting relay resets.

The supervisory control system consists of a series of relays and indicator lamps so connected that the operation of any overload relay operates a corresponding supervisory relay which locks itself in, lighting the corresponding indicator lamp. This indication remains on the board until reset by the operator. This enables the operator to tell at a glance in which circuit the overload occurred, even though the transmitter has returned to the air. This is particularly useful in checking for the possible cause of the outage.

Indicators from the supervisory control system can be included on a control console, one additional interconnecting lead being required for each additional function to be indicated.

In the main transmitter control system each additional control added to the console will require two additional leads between the console and the transmitter.

The control system details, including supervisory control, are clearly shown on Control Diagram, 7300473.

Nameplates are supplied identifying controls and relays to facilitate servicing and maintenance.

As shown in photograph C-5115, from left to right at the top of the upper panel, the first four switches apply power to the four power amplifier tube filaments. Only two are ordinarily closed at any one time, one for each cubicle; but in case of a tube failure, the spare tube in either cubicle can be switched in with minimum delay.

The four switches on the right apply filament power to the four modulator tubes, again only two being closed in normal operation.

*The relay system can be wired for any number of automatic resets between 1 and 10.

These eight switches as well as the row across the bottom of this panel are of the Deion type with thermal-overload release. This gives full protection of the power circuits without the use of fuses. A positive indication is given when tripped by overload in that the switch handle assumes a position in the middle of the slot. This protection is in addition to the protection given by the numerous overload and under-voltage relays employed throughout the major circuits of the equipment.

The two rows of relays and indicator lamps below the filament switches are the supervisory control system.

In the center of this panel are a group of switches and indicator lamps. The upper left of this group is the automatic reset switch for the 3000 volt rectifier. With this switch open, the set automatically returns to operating condition after the overload relay in the 3000 volt rectifier has tripped. When closed, an overload on the 3000 volt circuit locks the control system, preventing the return of the transmitter to normal condition until manually released by opening this switch, the 3000 volt "On" switch, or an equivalent switch on the console.

The upper center switch is the main rectifier automatic reset switch, which functions in a manner similar to the 3000 volt rectifier automatic reset switch.

The upper right switch is the automatic reset switch for the 1500 volt rectifier. This switch functions in the 1500 volt rectifier, in a manner similar to the 3000 volt and main rectifier automatic reset switches as just described.

The lower left switch is the power distribution bus voltage "lower" push button, which operates the distribution bus voltage regulator in the direction to reduce voltage. Above this push button is an indicator lamp which lights when the regulator has reached the minimum position.

In the middle are two indicator lamps above a switch. The switch controls the filament power for the complete transmitter. The green light indicates that the switches necessary for application of filament power are closed; in other words, "filament ready." The upper light, red, indicates when filaments are on.

The switch and lamp on the lower right are for power distribution bus voltage "Raise," operating to increase voltage from the voltage regulator. The lamp indicates when the voltage has reached its maximum. These "raise" and "lower" regulator controls are operative only when the "manual-automatic" switch (between the P.A. and modulator filament switches) is set for manual control. When this switch is set for automatic control, the regulator maintains the distribution bus at a potential determined by the adjustment of the

primary relay on the regulator.

Below the 1500 volt rectifier automatic reset switch is the supervisory control reset switch which resets the supervisory control relays. This is used to clear the supervisory control indications after an overload.

The switch below the 3000 volt automatic reset switch is the outage time clock restart switch.

Below the supervisory control relays is a row of Deion switches for the following circuits (shown on Photo C-5115): exciter filaments, main rectifier filaments, audio amplifier bias, modulator bias, control bus, P.A. bias, 400 volt rectifier, 1500 volt rectifier, and 3000 volt rectifier.

Behind the lower door, in the top row, are the main rectifier A.C. overload relays, main rectifier D.C. overload relay, 3000 volt rectifier overload relay, and 1500 volt rectifier overload relay.

The next row of relays are auxiliary, operating in connection with other relays in the following circuits: distribution bus undervoltage, main rectifier overload reset, main rectifier master overload, 3000 volt rectifier master overload, and 1500 volt rectifier master overload.

The three relays across the bottom are the distribution bus undervoltage relay, main rectifier overload reset timing relay, and main rectifier plate delay relay. These relays prevent the application of plate power until filament voltage (distribution bus) is normal, and until filaments have been operated for a sufficient time to reach normal operating temperature. The main rectifier overload reset relay resets the overload counting relay if the transmitter remains on the air longer than 5 seconds after an outage due to an overload. This assures the full three trials of automatic return to the air, when the transmitter is tripped off momentarily because of an overload.

The rear of the power control unit can be seen in photographs C-4967 and C-4968. The 3000 volt and 1500 volt metal rectifiers are mounted at the bottom of the unit and are cooled by direct air blast. The rectifier filters are shown mounted on the left side of the photograph, and the transformers at the top of the unit. On the right side are the group of contactors controlling the application of power to filaments, bias, 400 volt, 1500 volt, and 3000 volt rectifiers.

The contactors are controlled by the switches located on the exciter unit control panel, and simplify the control system by centralizing the control equipment (contactors, relays, etc.) in this unit. This also facilitates the connection of a console control unit to the transmitter, the control system switches and wiring carrying only

the small current necessary to operate the contactors.

This arrangement of equipment makes all circuits and parts readily accessible for servicing and maintenance.

IIIf. Main Rectifier

Seven type 857-B mercury vapor rectifier tubes are mounted in two rows from front to rear of the unit. Six of the tubes are active and are used in a 3-phase, full-wave circuit. The seventh tube has its filament energized and is thereby instantly available to replace a failure of one of the active tubes. The transfer is made with contactors operated by controls on the front panel. Interlocks in the electrical control circuit prevent reapplication of plate power if two tube transfer relays are energized simultaneously. It is possible to replace a defective tube in the circuit by this method in less than one second. The complete physical replacement can then be made during a regular maintenance period without loss of time on the air. See photographs C-4964 and C-4965 for views of this unit.

The lower door covers the rectifier control panel on which are mounted seven Deion switches connected in the primary circuits of the filament transformers, and the push button and indicator lamps for the tube transfer contactors. This door is not interlocked as all controls are of the dead front type.

Directly beneath each tube is located its individual filament transformer. Below the filament transformers are mounted the filter capacitors, power-factor correction capacitors and the air inlet from the main blower. The transfer contactors are mounted on the walls of the cubicle, convenient to the associated tubes.

The filter capacitors are individually fused. In case of a capacitor failure, the defective capacitor is automatically removed from the circuit and shorted.

The power factor correction capacitors maintain the overall power factor of the equipment at a value of better than 90%.

Each tube is supplied with air through an individual air nozzle directed on the glass above the base. This air, in conjunction with an air heating unit and thermostat, maintains the temperature of the condensed mercury in the tubes within the recommended range, over a wide range of ambient temperatures.

The filter reactor and rectifier plate transformers are external to the rectifier unit and are usually located with the power transformers and voltage regulators. This equipment may be conveniently mounted in the basement of the building, or same floor with the transmitter, as all units are air cooled.

IIIg. Transformers, Reactors, and Power Equipment

This section describes the transformer, voltage regulators, reactors, etc., which are supplied as part of the transmitter equipment but which are not mounted in the main transmitter units. In normal installation, this equipment is mounted in an enclosure external to the transmitter cabinets. The air-cooled dry type transformers, reactors and regulators have several distinct advantages over the oil insulated type. The air-cool dry type can be housed indoors on the same floor as the transmitter proper and/or in the basement of the building as this type of equipment does not require a transformer vault. The fire hazard from oil is completely removed from this type of equipment as these units do not contain any oil. The overall average weight and dimensions are reduced over the oil insulated type, therefore equipment can be housed in a much smaller space.

Modulation Transformer

The modulator transformer is used in conjunction with the modulator unit described under Section IIIb. The transformer is rated at 36 KV-a with a frequency range of 30 to 10,000 cycles. It is 56" widb,, 78-7/8" high, 46-1/2" deep, and weighs approximately 4750 lbs.

Heising Choke

The Heising choke is connected in series with the power amplifier plate supply, modulation being introduced across this choke from the modulation transformer through a suitable coupling capacitor. This relieves the modulation transformer secondary of carrying the power amplifier plate current.

The Heising choke is conservatively rated at 25 henries, 7 amperes D.C., and 22,000 volts. It is air cooled and weighs approximately 2500 lbs. It is 40" wide, 68" high, and 30" deep.

Filter Choke

The filter choke is used in the main rectifier filter circuit to assist in reducing the ripple from the rectifier to a negligible value. Used in conjunction with the filter capacitors in the rectifier unit, the filter choke is very effective.

The filter choke is rated 1 henry, 15 amp., 15,000 volts. It is connected in the low potential lead from the rectifier, hence its rating is exceedingly safe.

The filter choke is 16" wide, 27" high and 20" deep and weighs 440 lbs. This is also air cooled.

Main Rectifier Regulator

The main rectifier voltage regulator is used to control the output

voltage of the main rectifier. The voltage regulator is remotely controlled from the power amplifier unit. It is rated 37.5 Kva., 2400 volts with secondary current rating of 36 amp. The voltage regulator is 3 phase, air cooled. The output voltage can be controlled plus or minus 25% from normal line. The unit is 26-1/2" wide, 70-7/8" high and 30-1/2" deep, weighing 3900 lbs.

Main Rectifier Transformers

The main rectifier tubes are supplied with plate power from the main rectifier transformers. This transformer equipment is three single phase transformers.

The 3 single phase transformers are air cooled units of the following rating. 35 kv-a, 2880 volts primary and 9000 volts secondary. The three transformers will be connected delta primary, delta secondary. The rating is sufficient to operate the transmitter at 35 kw, average modulation, from two transformers connected in open delta, in case of a transformer failure. These units are 37" wide, 55" high and 27" deep, weighing 1400 lbs. each.

Distribution Bus Regulator

The distribution bus voltage regulator is used in conjunction with the power distribution transformer to vary the distribution bus voltage from 0 to 240 volts. The distribution bus, as previously mentioned, supplies power for all filaments, bias and low plate voltage rectifiers (all rectifiers except the main rectifier). The regulation of this bus over the wide limits permits the gradual increase of filament voltage to normal in starting the equipment, which is desirable for maximum tube life, even though instant application of normal filament voltage is permissible because of the use of constant current transformers as described in Section IIIb. Since the distribution bus is maintained at normal potential during normal operation, all filament, bias and plate voltages, except the main plate voltage, are maintained at normal values. This voltage regulator is rated at 22.5 kv-a and is air cooled and motor-operated by remote control. The primary of the regulator is connected to the 2400 volt power distribution breaker. The three secondaries, rated for 108 amperes, are connected to the three corners of the delta connected secondary circuit of the distribution transformers.

This voltage regulator is 24-1/4" wide, 58-1/8" high and 26-1/4" deep and weighs approximately 2000 lbs.

Distribution Transformers

To supply power to the distribution bus in connection with the voltage regulator above, 3-15 kv-a distribution transformers are supplied. These transformers are 2400 volt primary, 120 volt secondary. The distribution transformer secondaries are connected

in "delta" so that 120 volts without variation is supplied for operation of the control system and blower motor. The secondaries of the voltage regulator connect to the corners of the delta so that the voltage applied to the filaments, bias, and low voltage rectifiers can be varied from zero to maximum as described above, without effecting the control system or blower motor. See Schematic Diagram 7606368. These air cooled units are 14-1/2" wide, 22-5/8" high and 15-5/8" deep, weighing 192 lbs. each.

IIIh. Instruction Books

Each equipment will be supplied with two copies of the Instruction Book for the Westinghouse 50-HG-1 Transmitter. This instruction book will contain complete adjustment and operation information in sufficient detail to assure correct procedure by reasonably skilled operating personnel. It will be complete with schematic and interconnection diagrams expanded in sufficient detail to be readily useable in installation, servicing and maintenance.

A complete list of electrical parts with ordering information will be included to simplify replacement of electrical parts, or expendable items or parts thereof.

A list of recommended spare parts will be supplied which should cover ordinary service requirements for two years.

IIIi. Air Cooling System

The Westinghouse 50-HG-1 Broadcast Transmitter requires a source of air capable of delivering 10,000 cubic feet of air per minute against a resistance head of approximately 2".

Two Sturtevant Blowers - Silent Vane fans No. 95 or equivalent equipped with Westinghouse 7-1/2 h.p., 120 volt, 3 phase motors are supplied with this equipment. One blower is adequate for delivering all air required for cooling the entire transmitter; the second unit serves as a spare.

Assistance in designing the layout for the ducts and filter for the cooling air will be supplied as part of the service included with the equipment.

IIIj. Tubes

The transmitter can be supplied complete with tubes and/or spare tubes as may be desired. The detailed list of tubes necessary for the operation of the transmitter is as follows:

2 - Type 6J7	2 - Type 849
2 - Type 802	2 - Type 893AR
5 - Type 807	2 - Type 895AR
1 - Type 803	6 - Type 857-B
2 - Type 833	2 - Type VR-150-30
2 - Type 828	

To fill spare sockets, the following additional tubes are required to take full advantage of the quick tube replacement features:

2 - Type 893AR
2 - Type 895AR
1 - Type 857-B

IV. Accessories and Special Equipment

Many accessories and special equipment items are required or desirable for the operation of a radio station. However, their nature is such that various installations have diversified requirements so that this equipment should be designed to meet the requirements of the particular installation.

Inter-cubicle wire is to be supplied by the customer.

Recommendations, detailed descriptive literature, and quotations will gladly be submitted upon request.

IMPROVEMENTS

In the construction of the equipment described in this specification, the full intent of the specification will be carried out. However, it is assumed that any minor changes which may be found desirable later for reasons of improved design or construction will be accepted.

The Westinghouse Electric Corporation reserves the right to make changes in design or to make additions to or improvements in its products without imposing any obligation upon itself to install them on its products previously manufactured.

CONSTRUCTION PERMIT

The following data is submitted in the form required in application for a Construction Permit to the F.C.C. The paragraphs are numbered to correspond to the paragraph numbers in the standard F.C.C. Form No. 301. (Revision April 25, 1944)

18. Description of transmitting apparatus proposed to be installed:

(a) Make Westinghouse Electric Corporation Type No. 50-HG-1

(b) Oscillator: Type of circuit Piezo-Electric Number, manufacturer's name, and type of tubes WL-802 Normal plate current, per tube .018A. Plate voltage 400V.

(c) List buffer and intermediate power amplifier stages, by number and type of tubes in each stage Buffer 1-WL-807, Int. 1-WL-803, Driver 2-WL-833-A.

(d) Last radio stage: Number, manufacturer's name, and type of tubes 2 Westinghouse Electric Corporation WL-895AR

Normal night operation for power requested: Plate current per tube 2.84

Plate voltage 11 K.V. If greater day power than night power is requested, specify the following:

Normal Day Operation: Plate current, per tube _____ Plate voltage _____ Describe fully the proposed method and procedure of reducing power at sunset -

(e) Modulator or last audio stage: Number, manufacturer's name and type of tubes and how operated (Class "A", "A" Prime", or "B") 2, Westinghouse Electric Corporation WL-893AR Operated Class "B".

Normal plate current, per tube, 0% Mod. .1 A; 100% Mod. 2.2 A. Plate Voltage 11 K.V.

(f) Which radio stage is modulated? Last

(g) What system of modulation is employed (high level, low level, grid bias in last radio stage, etc.)? High Level

(h) If low level modulation is employed, give for modulated radio stage: Number and type of tubes _____ Plate current, per tube _____ Plate voltage _____

(i) The transmitter is designed for what maximum percentage of satisfactory modulation? 100%

(j) State name and type number of modulation monitor _____

(k) Give Federal Communications Commission approval number _____

(l) Specify manufacturer's name, type, number, and full scale reading of the following meters:

(1) In last radio stage:

Plate Voltmeter Westinghouse Type KX 15 K.V.

Plate Ammeter Westinghouse Type KX 10 A.

(2) Antenna Ammeter Westinghouse Type KX (Full scale reading to be as determined by antenna requirements)

(m) Describe the plate power supply for last radio stage 3 phase, full wave, 6 WL-857-B.

Rating: Current 12 A. Voltage 12 K.V.

(n) Maximum carrier power output of transmitter for satisfactory operation is 53,000 watts.

(o) Maximum rated carrier power of transmitter as determined by orders of the Federal Communications Commission is 50,000 watts.

20. Description of automatic frequency control equipment:

(a) Make Westinghouse Elec. Corp. Type No. LK-1.

(b) Give manufacturer's name, type of cut, and temperature coefficient in cycles per degree centigrade of the quartz crystal RCA - V cut, 1 cycle/degree C.

(c) By whom will unit be calibrated? RCA

Calibrated frequency: _____ kilocycles at 60 degrees Centigrade.

Proposed operating frequency: _____ kilocycles. (Give exact figure, correct to third decimal place at 60 degrees Centigrade.)

(d) Stage guaranteed accuracy of the calibration; ± 1 cycle

(e) State number of frequency control oscillators which will be maintained constantly at correct operating temperature and frequency in heat-controlled chambers Two

(f) Is provision made for instantaneous connection of spare frequency control units? Yes

(g) Manufacturer's name and type of automatic temperature control RCA Type TMV, 129B .

(h) State within what limit automatic temperature control will hold the temperature 1/4°C. degrees Centigrade.

(i) State temperature coefficient of the frequency control units: 1-1/2 cycles per degree Centigrade.

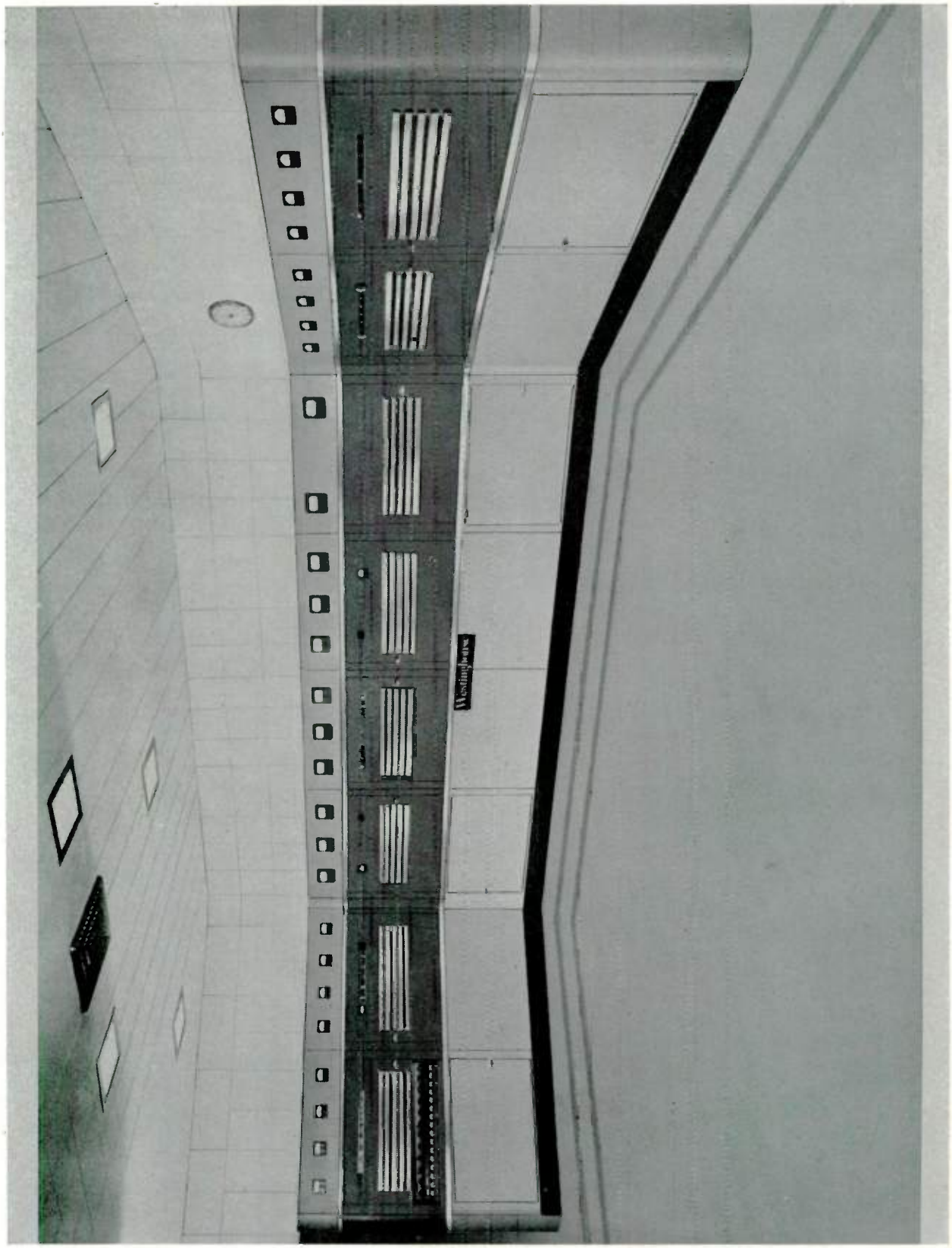
(j) Is temperature coefficient positive or negative? Zero at 60°C.

(k) State manufacturer's name and rated accuracy of: Thermostat Edison Elec. Control 1°C.

Thermometer None

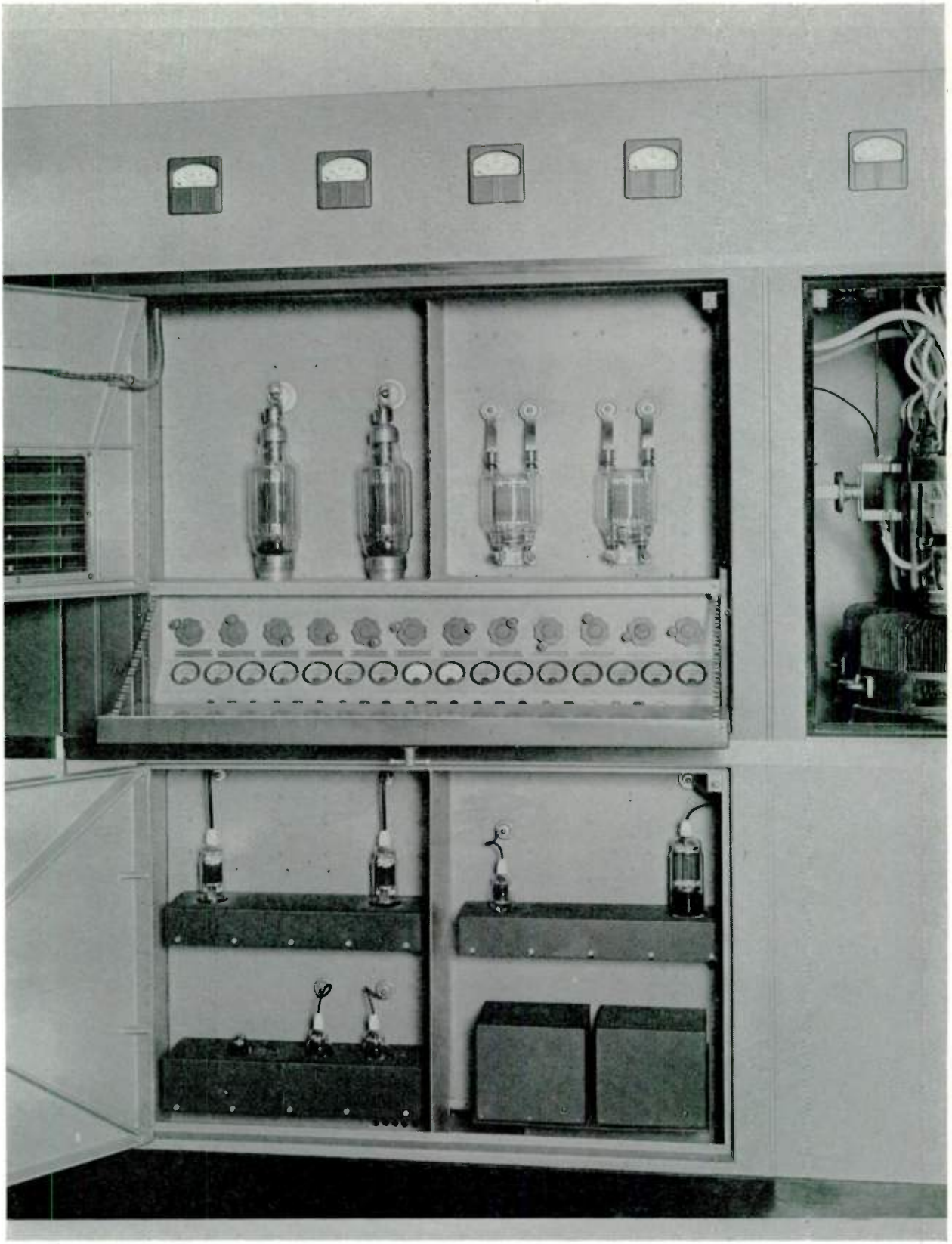
(l) Attach the circuit diagram of automatic temperature control system if not already on file with the commission. On file.

(m) Attach a sketch or drawing of the automatic temperature control chamber, if not already on file with the Commission. On file: RCA Type TMV-129-B



TYPICAL INSTALLATION OF THE WESTINGHOUSE TYPE HG TRANSMITTER

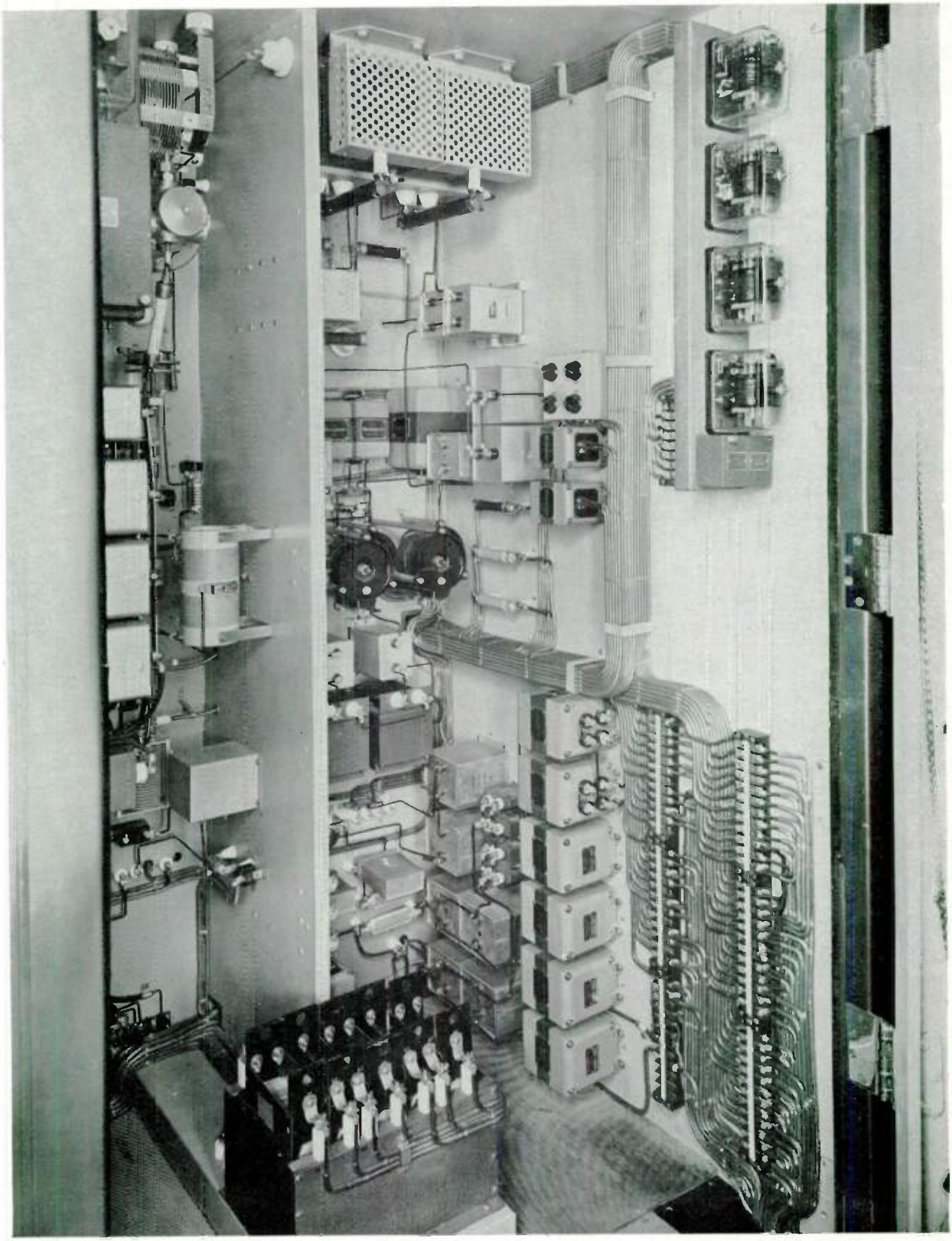
Photo C-7144



1 KW EXCITER, FRONT VIEW

Showing convenience of tuning controls and accessibility of tubes.

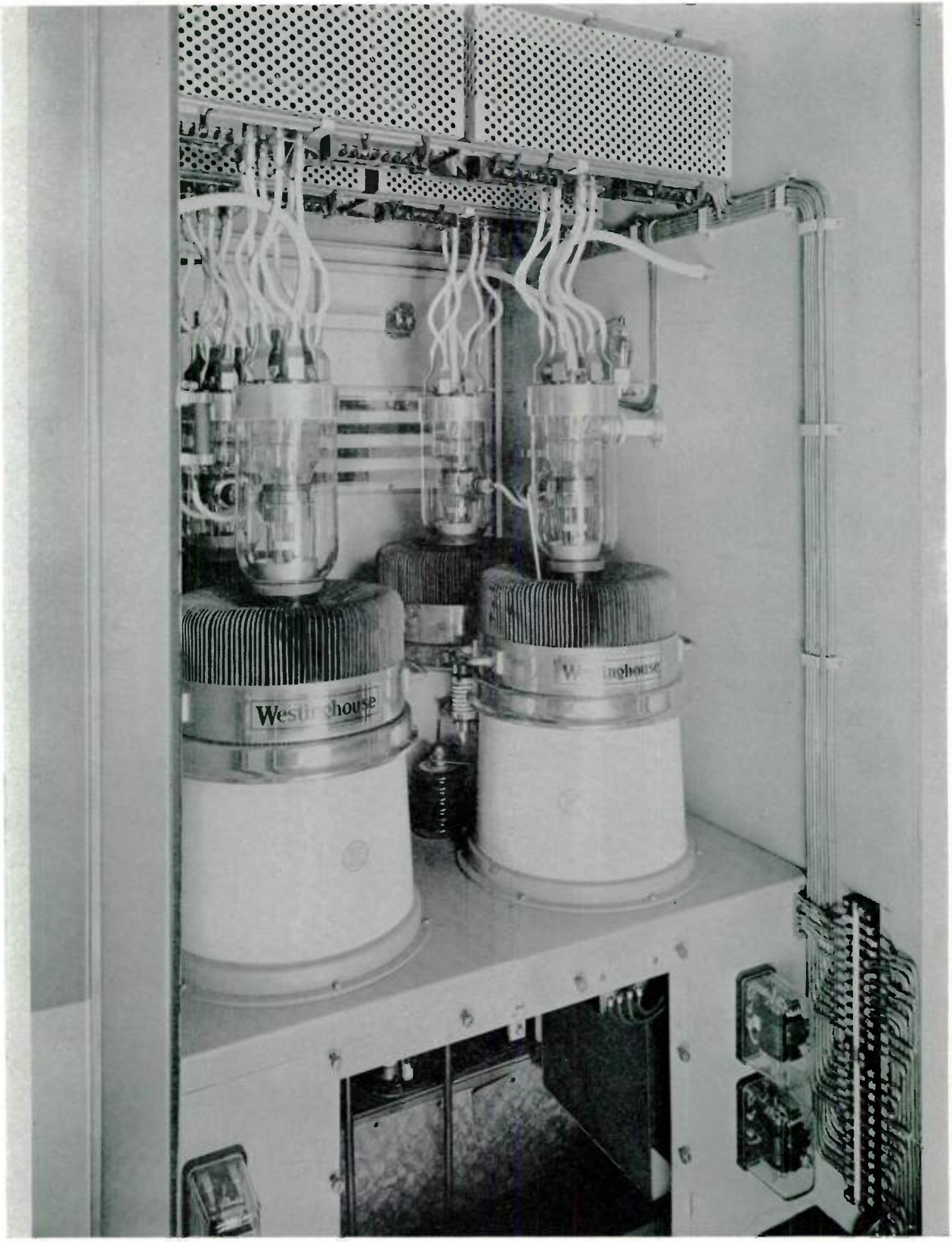
Photo C-4966



1 KW EXCITER, REAR VIEW

Metal rectifiers are shown on floor of cubicle.

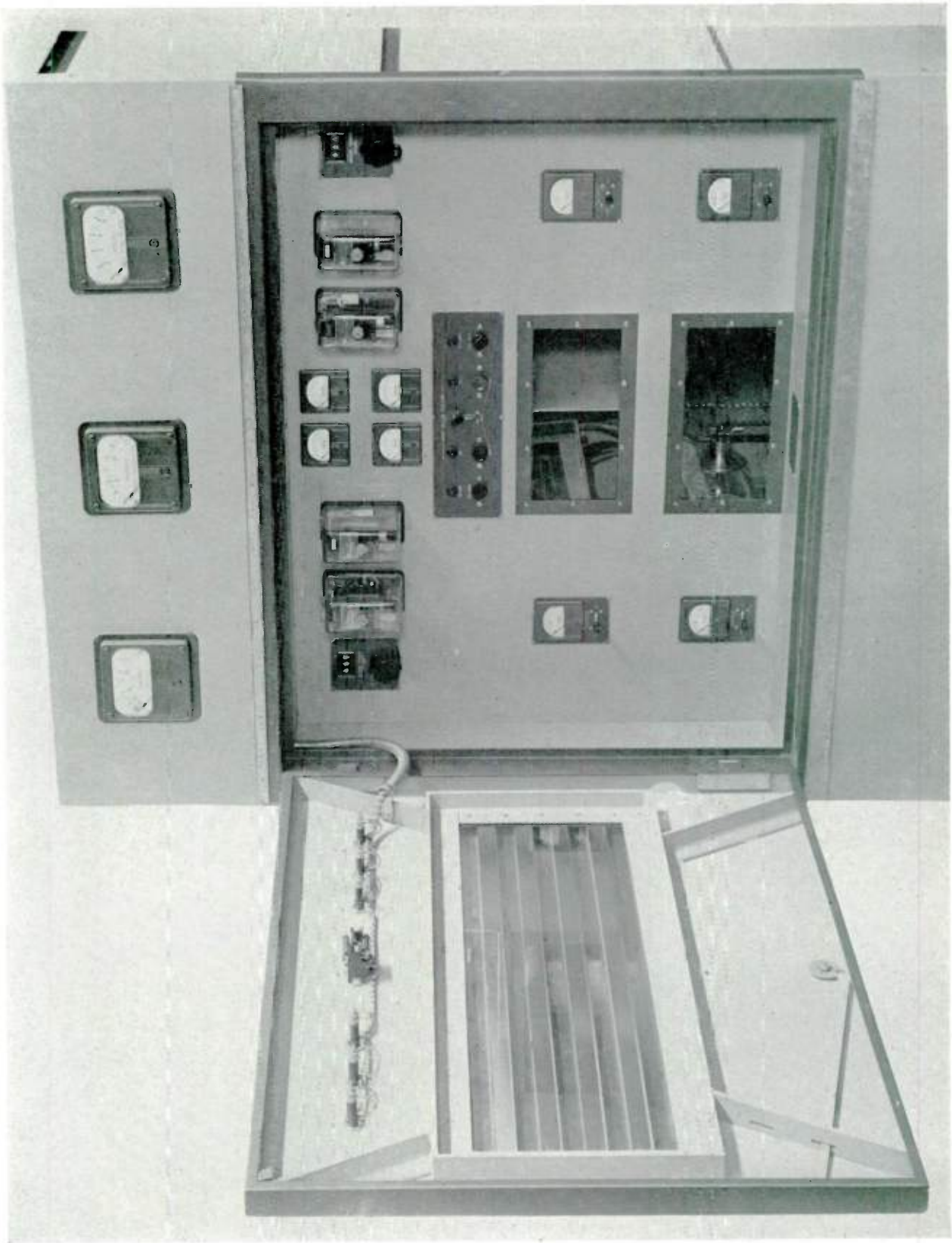
Photo C-4969



MODULATOR, REAR VIEW

Two of the WL-893-R tubes are spares

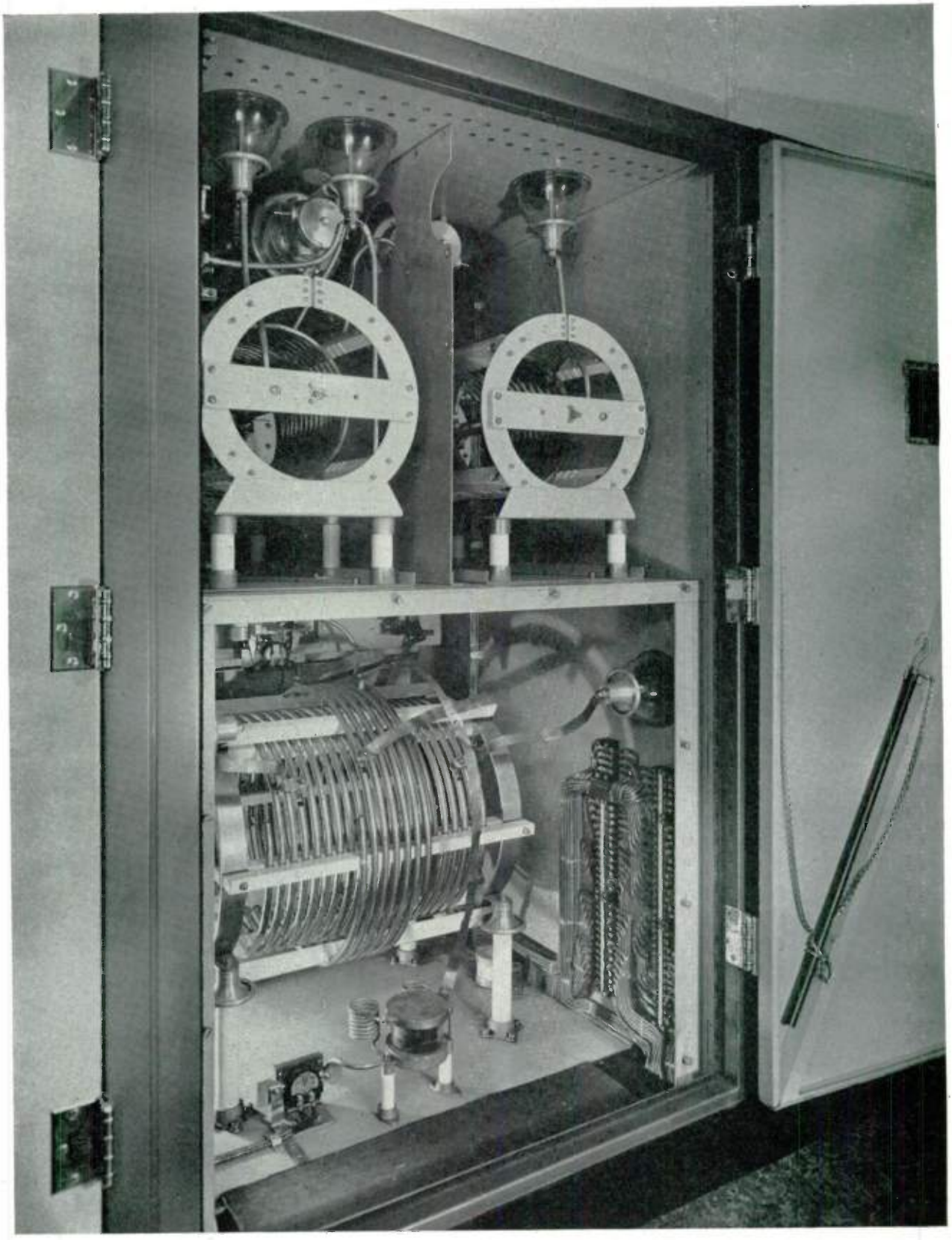
Photo C-4963



POWER AMPLIFIER, CENTER UNIT, FRONT VIEW

The protective cover has been removed from the indicator lamp sockets.

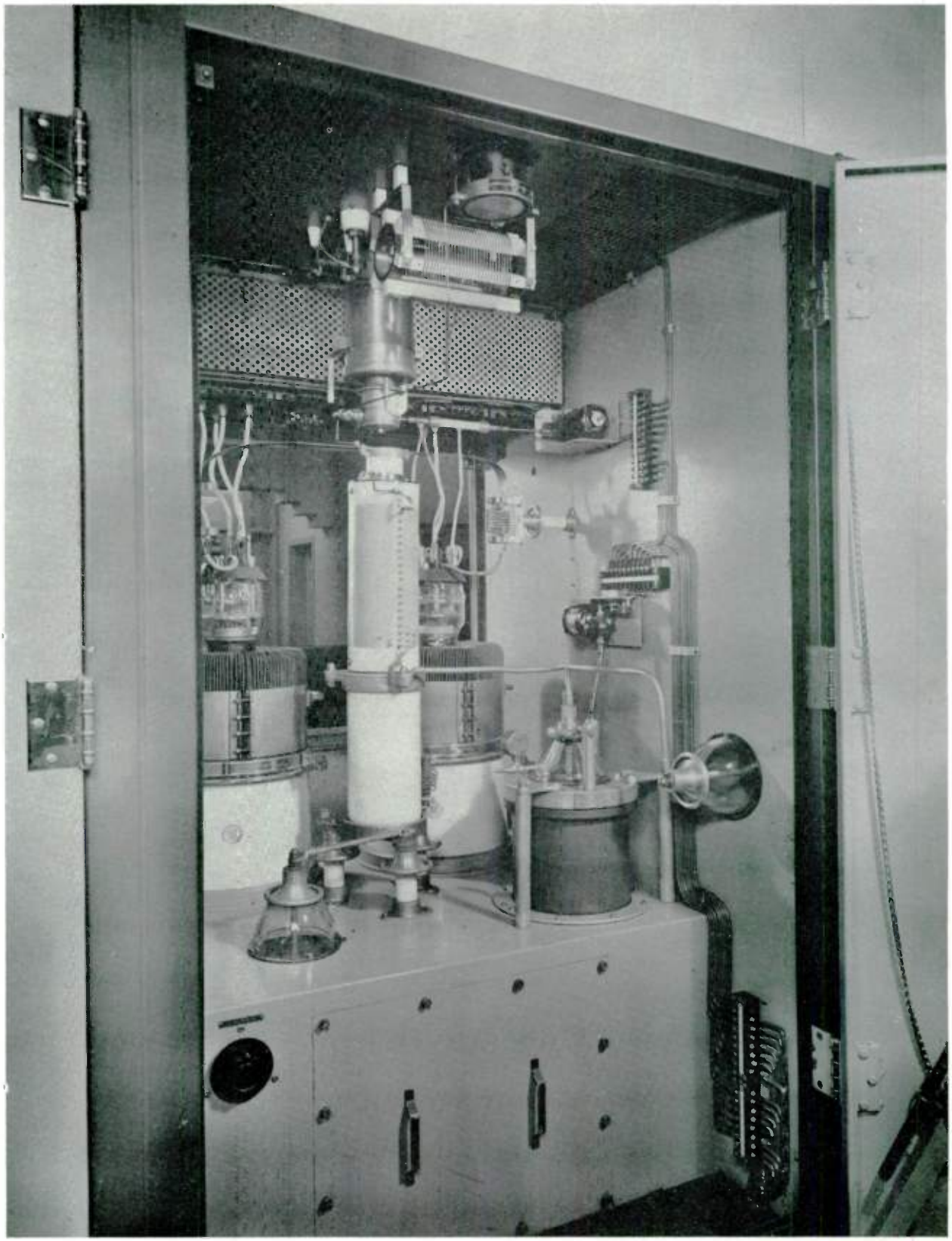
Photo C-4645



POWER AMPLIFIER, CENTER UNIT, REAR VIEW

Two antenna array branching coils are shown in place in upper portion of cubicle.

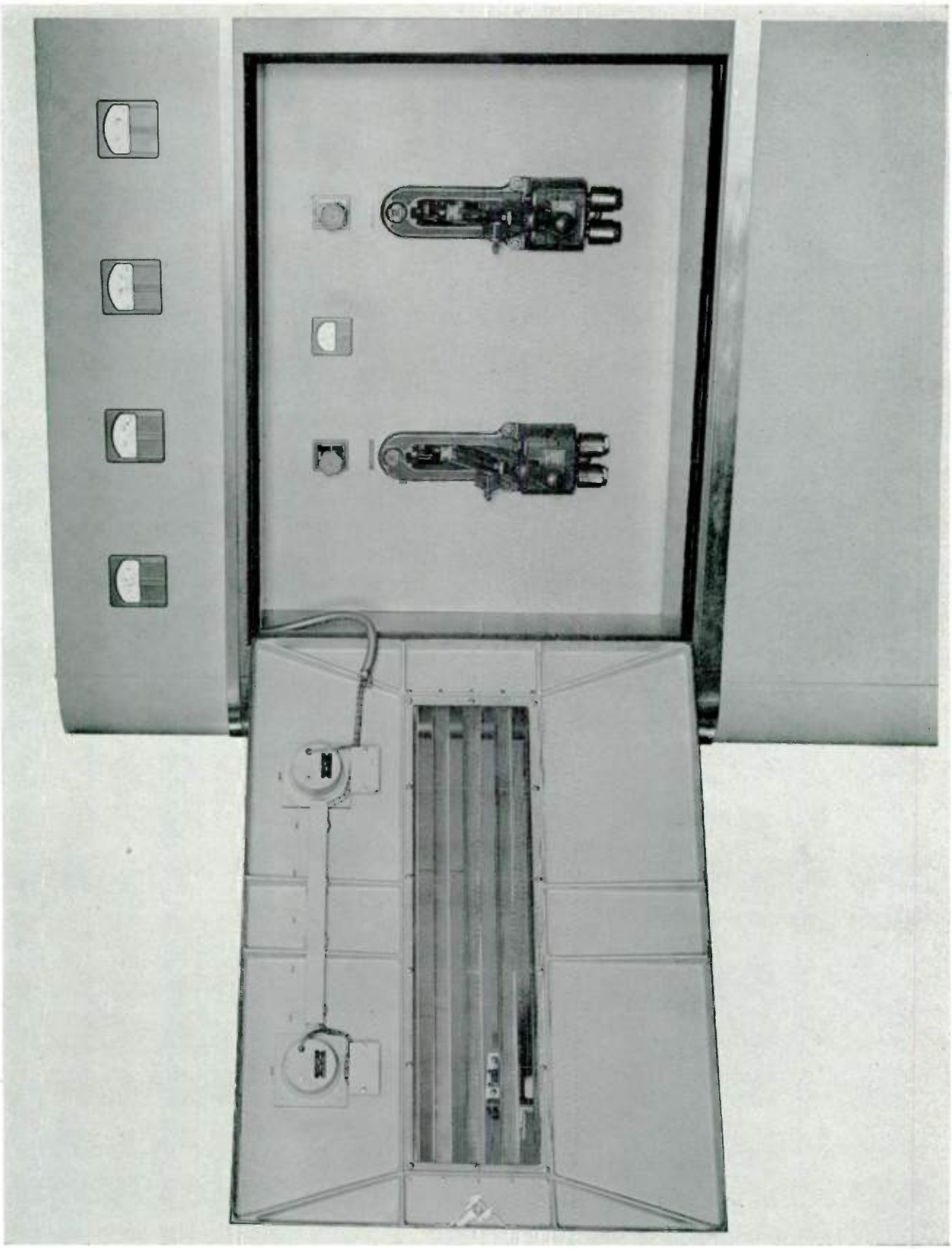
Photo 296249



POWER AMPLIFIER, RIGHT UNIT, REAR VIEW

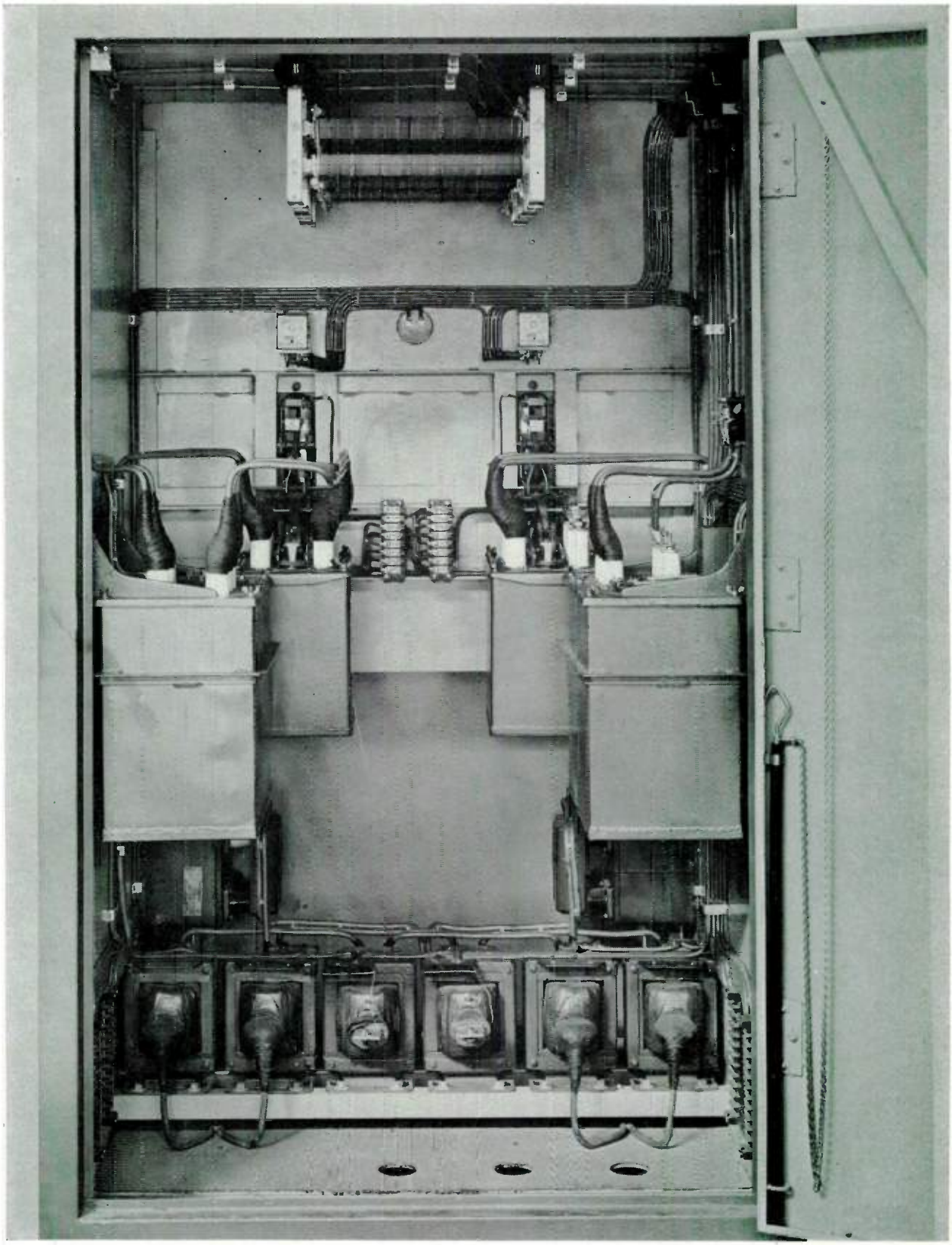
One 895-R tube is a spare.

Photo 296248



POWER DISTRIBUTION, FRONT VIEW

Photo C-5114



POWER DISTRIBUTION, REAR VIEW

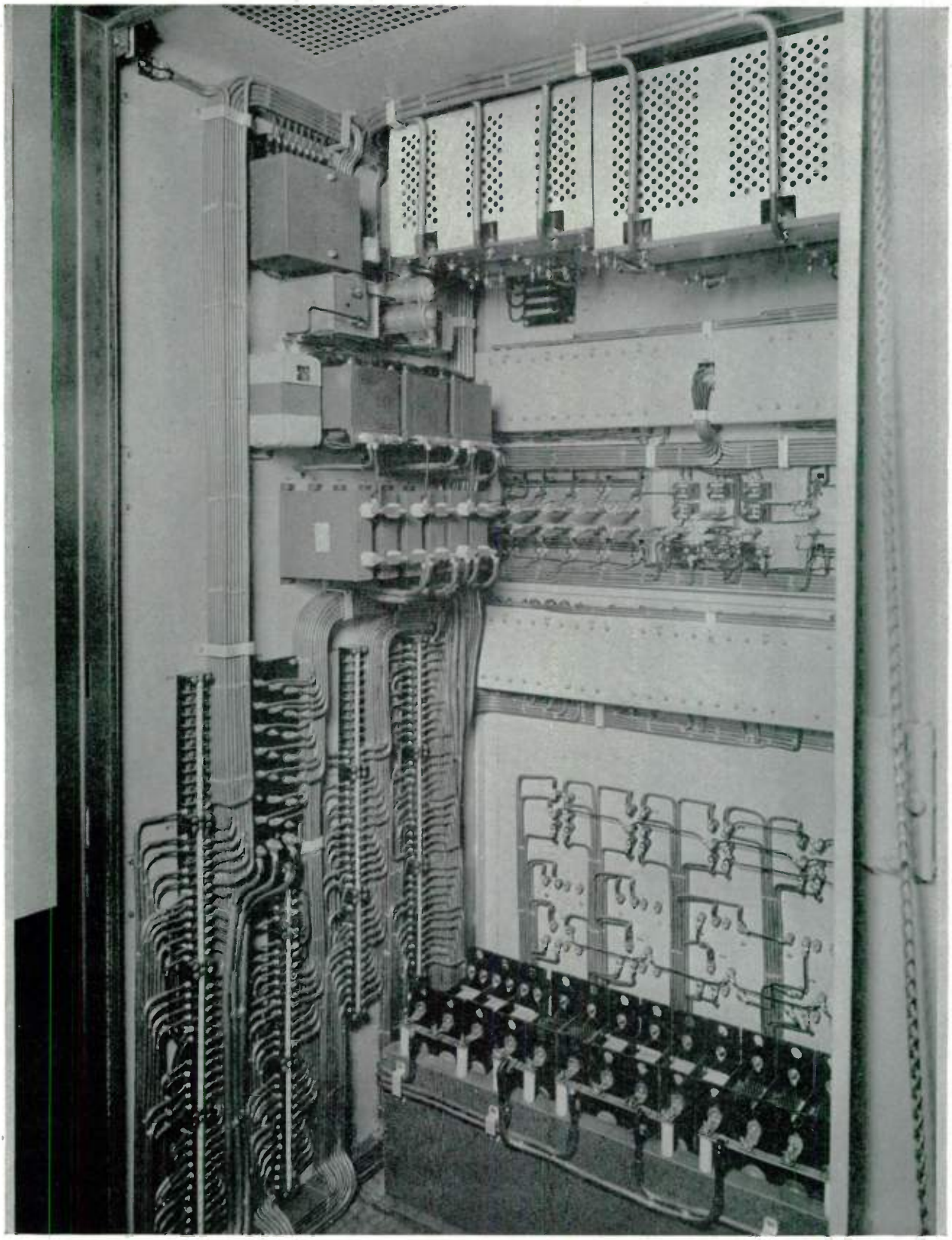
Power for the entire transmitter terminates and is metered in this cubicle.

Photo C-4559

POWER CONTROL, FRONT VIEW

Supervisory control relays and indicator lamps are shown in the upper portion of the cubicle.

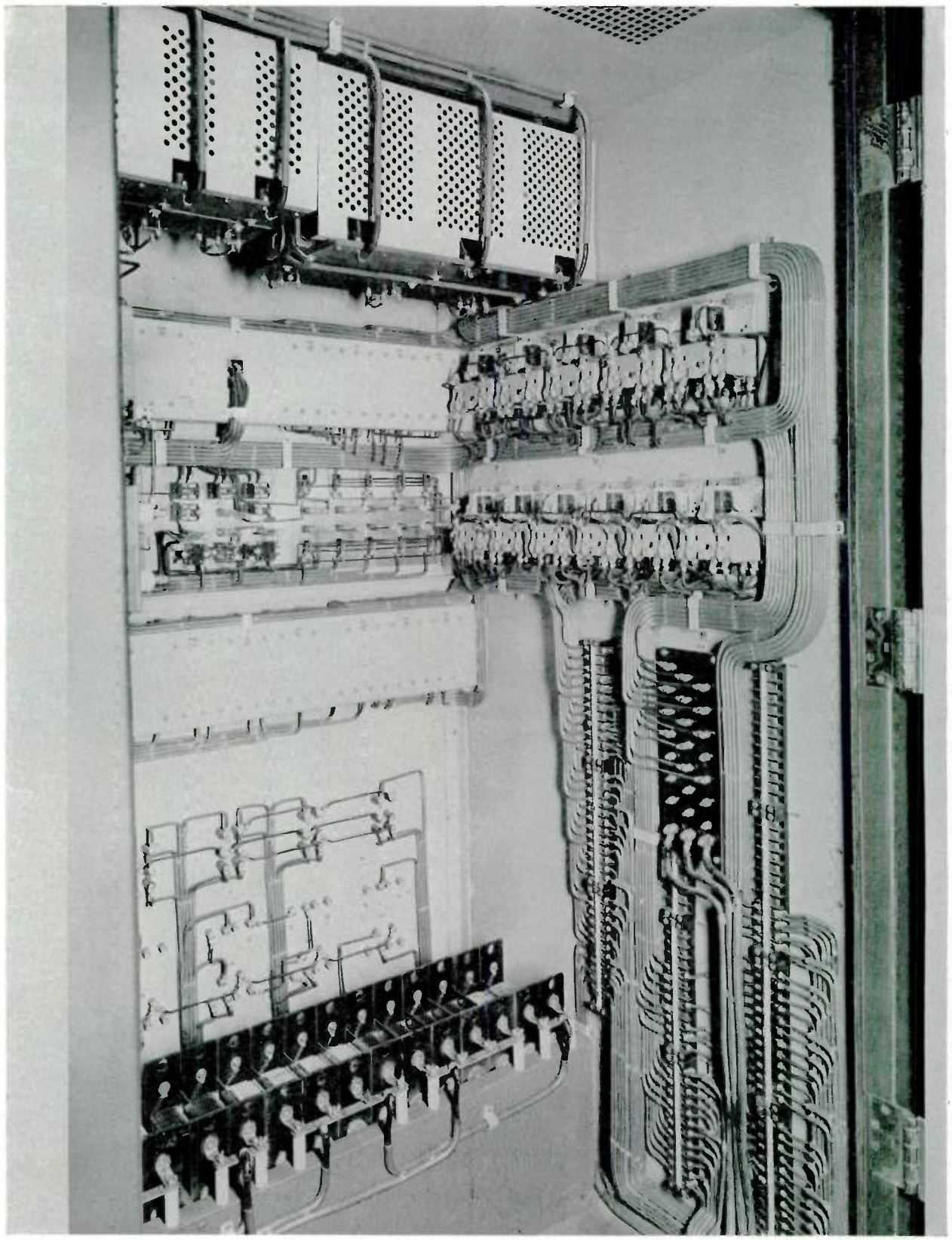
Photo C-5115



POWER CONTROL, REAR VIEW

The 1250 volt and 3000 volt metal rectifiers are shown in the base of the cubicle.

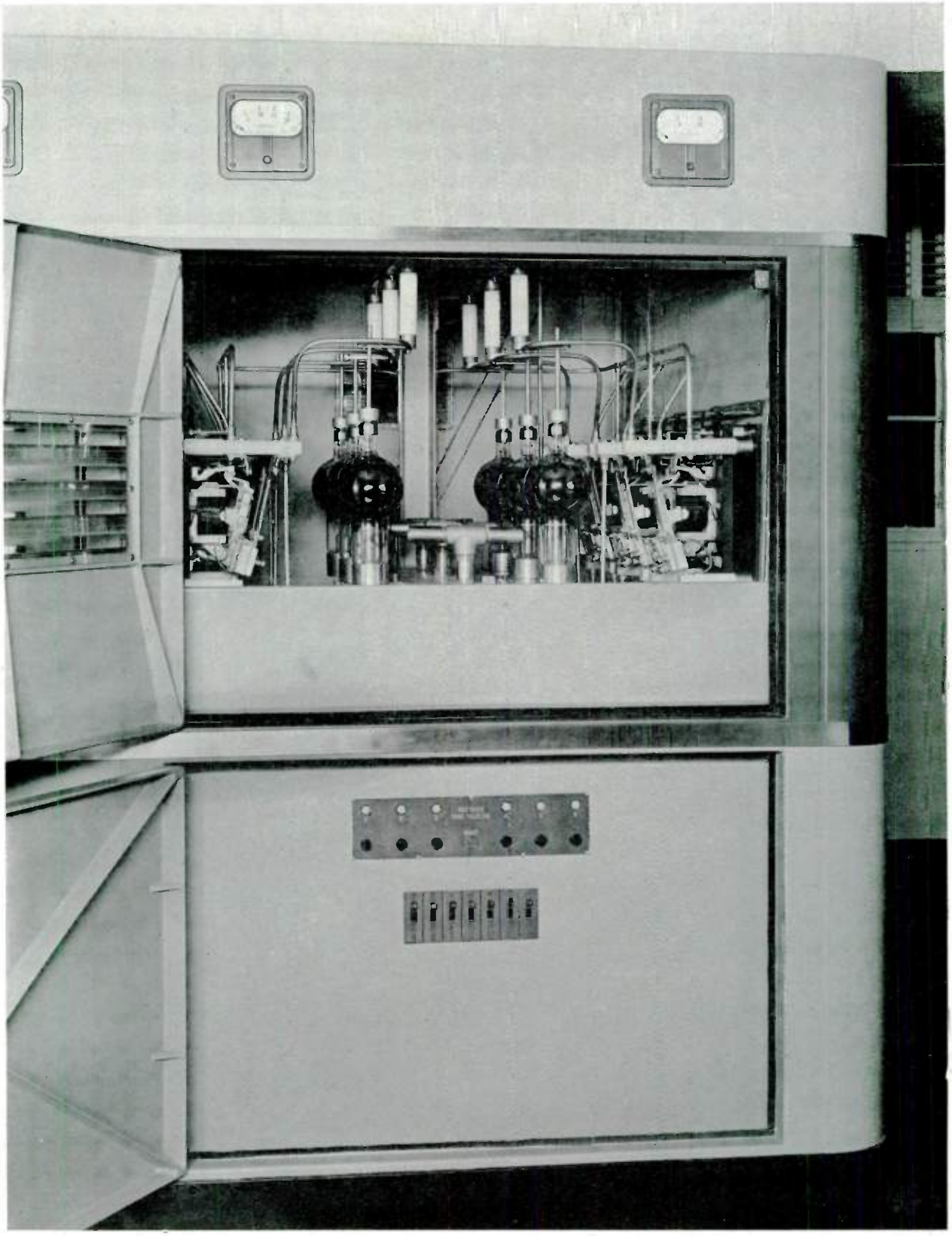
Photo C-4967



POWER CONTROL, REAR VIEW

The 1250 volt and 3000 volt rectifier transformers are shown in top of cubicle.

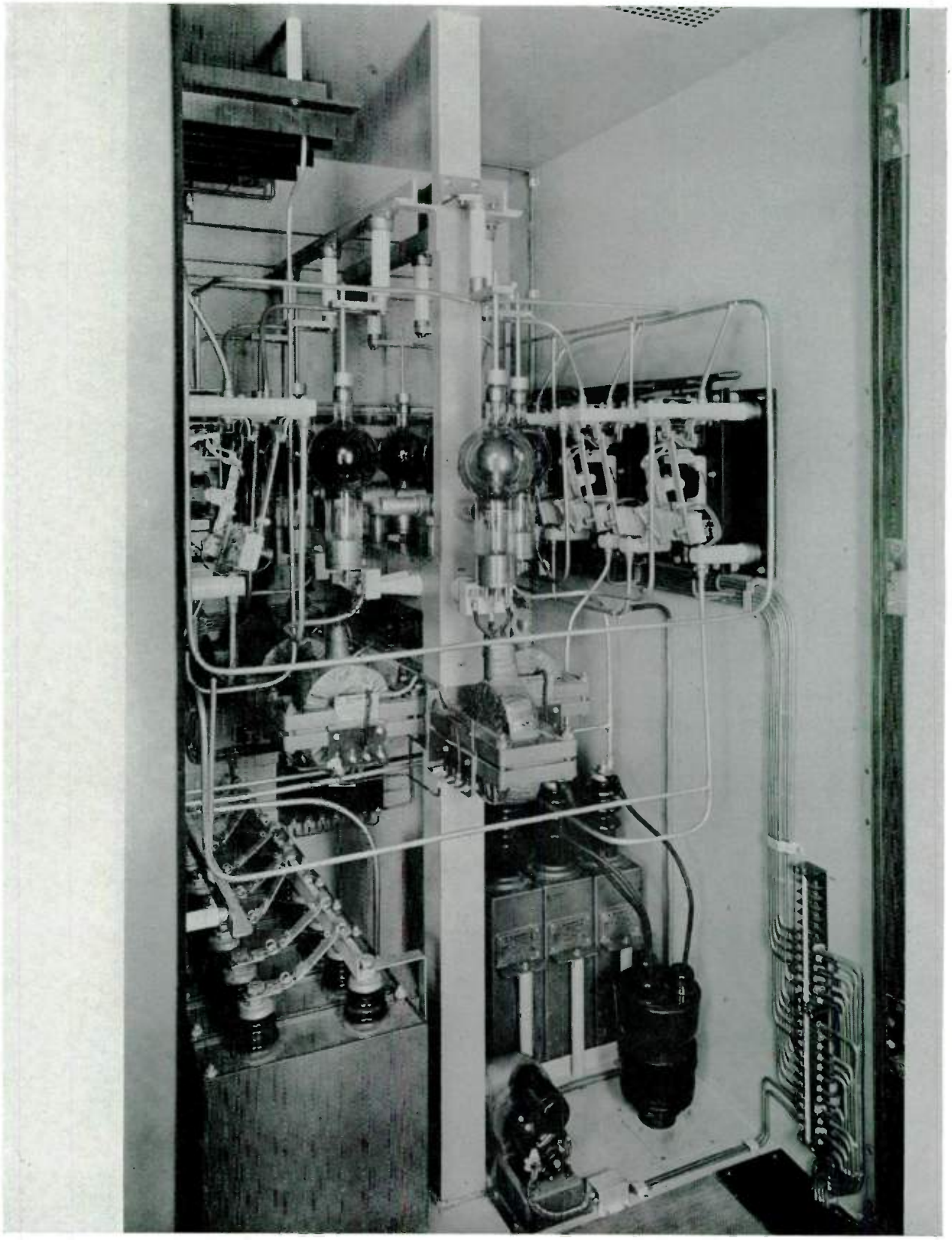
Photo C-4968



HIGH VOLTAGE RECTIFIER, FRONT VIEW

Selector switches for automatic transfer of the spare rectifier tube are shown immediately above the individual tube filament switches.

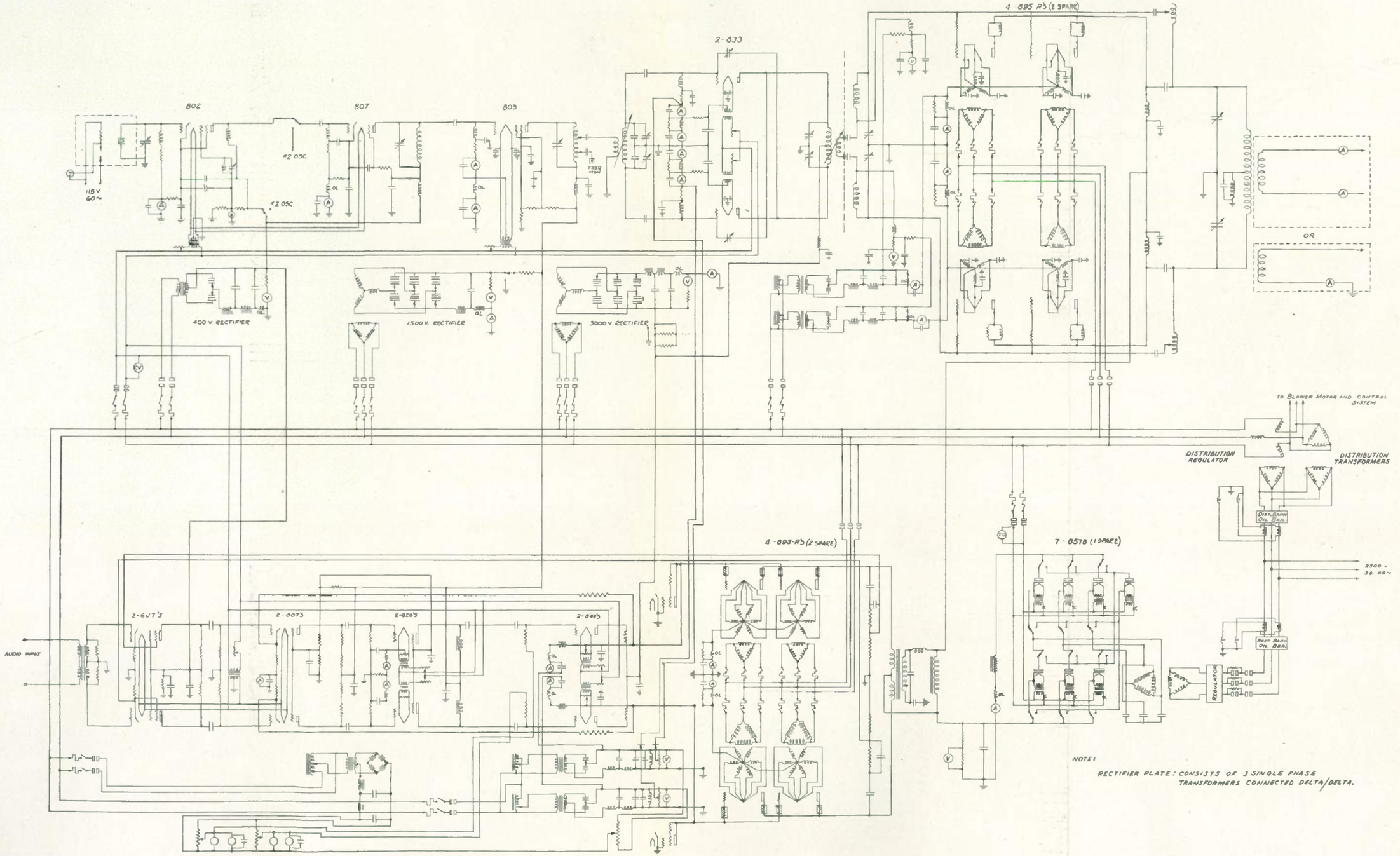
Photo C-4965



HIGH VOLTAGE RECTIFIER, REAR VIEW

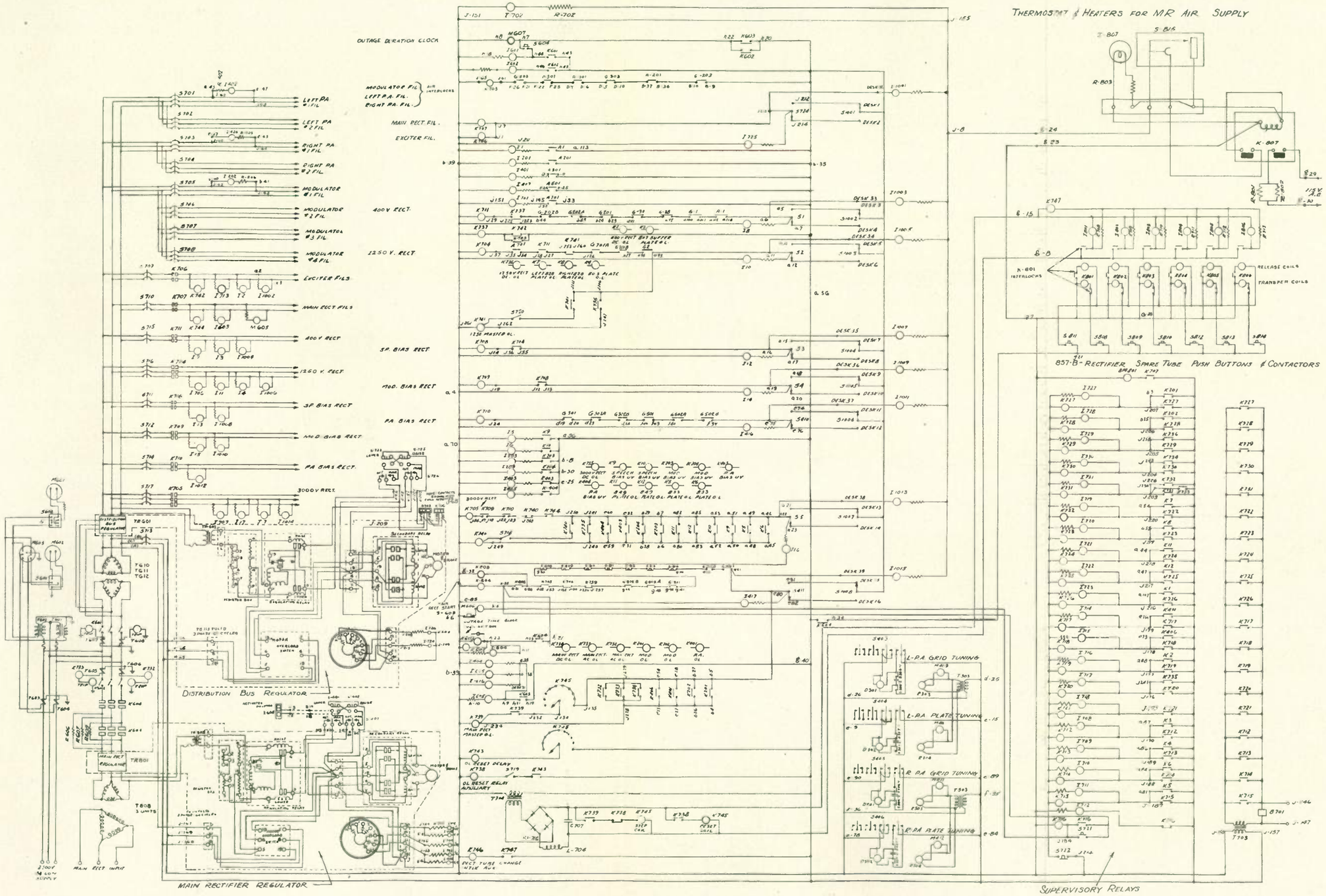
The spare rectifier tube is shown in the center of the picture.

Photo C-4964

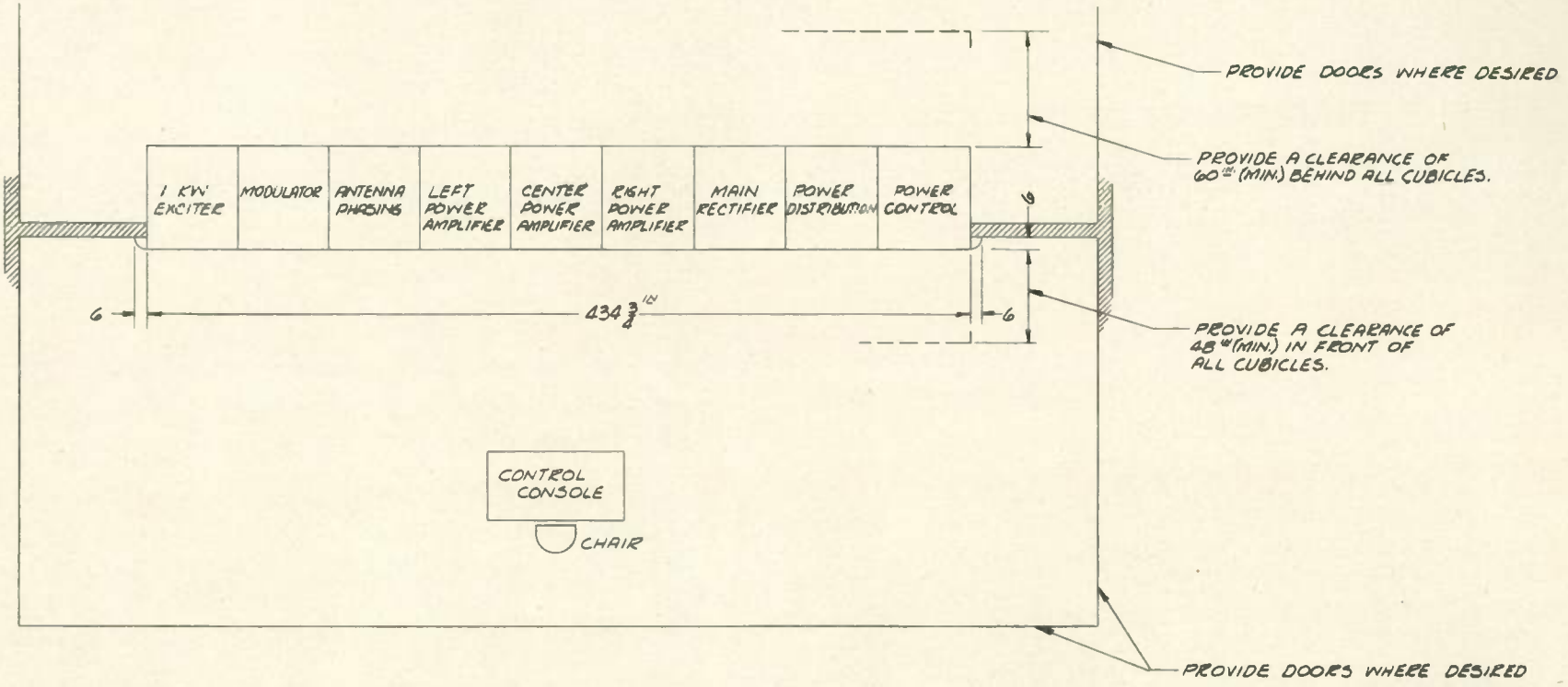


NOTE:
RECTIFIER PLATE: CONSISTS OF 3 SINGLE PHASE TRANSFORMERS CONNECTED DELTA/DELTA.

SCHEMATIC DIAGRAM
(Dwg. 7606368)



CONTROL DIAGRAM
(Dwg. 7300473)



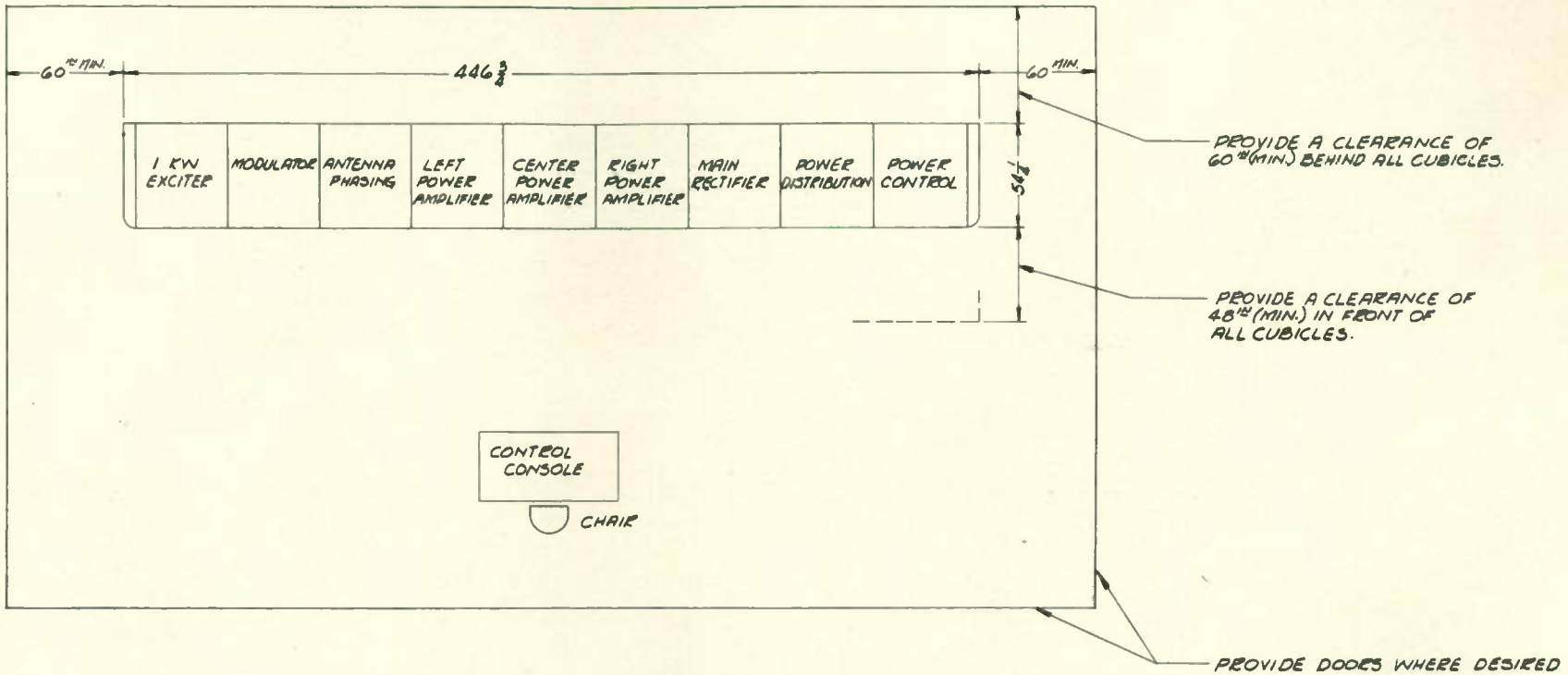
50 K.W. TRANSMITTER LAYOUT DESIGN #1
(Dwg. 7717770)

NOTES

EACH CUBICLE IS 48¾ WIDE X 54½ DEEP X 80⅜ HIGH AND RESTS ON A 4" HIGH SUB BASE & WEIGHS APPROX. 4000 LBS.

AIR IS REQUIRED FOR ALL BUT TWO OF THE CUBICLES AND IS SUPPLIED BY DUCTS BELOW THE FLOOR. THE AIR TRAVELS THROUGH THE CUBICLES AND EXHAUSTS AT THE TOP THEREFORE EXHAUST DUCTS ARE NECESSARY. THE EXHAUST DUCTS USUALLY EXTEND FROM THE TOP OF THE CUBICLE TO THE CEILING. FALSE DUCTS ARE GENERALLY BUILT ABOVE THE CUBICLES NOT REQUIRING AIR SIMPLY TO MAKE THE DESIGN SYMMETRICAL. (THE TWO CUBICLES NOT REQUIRING AIR ARE THE CENTER POWER AMPLIFIER AND THE POWER DISTRIBUTION.)

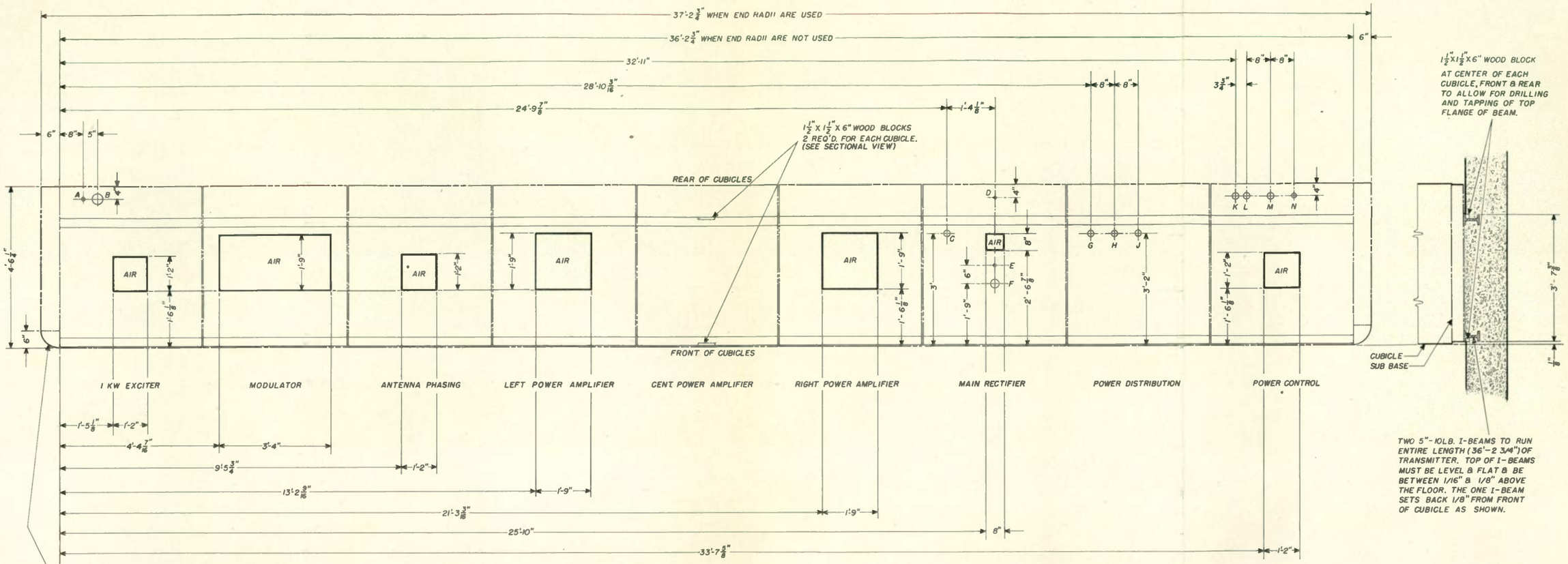
50 K.W. TRANSMITTER LAYOUT DESIGN #2
(Dwg. 7717771)



NOTES

EACH CUBICLE IS 48 1/4" WIDE X 54 1/4" DEEP X 80 3/8" HIGH AND RESTS ON A 4" HIGH SUB BASE & WEIGHS APPROX. 4000 LBS.

AIR IS REQUIRED FOR ALL BUT TWO OF THE CUBICLES AND IS SUPPLIED BY DUCTS BELOW THE FLOOR. THE AIR TRAVELS THROUGH THE CUBICLES AND EXHAUSTS AT THE TOP THEREFORE EXHAUST DUCTS ARE NECESSARY. THE EXHAUST DUCTS USUALLY EXTEND FROM THE TOP OF THE CUBICLE TO THE CEILING. FALSE DUCTS ARE GENERALLY BUILT ABOVE THE CUBICLES NOT REQUIRING AIR SIMPLY TO MAKE THE INSTALLATION SYMMETRICAL. (THE TWO CUBICLES NOT REQUIRING AIR ARE THE CENTER POWER AMPLIFIER AND THE POWER DISTRIBUTION.)



6" DEEP END RADIUS IS INTERCHANGEABLE WITH 4'-8 1/4" DEEP END RADIUS.

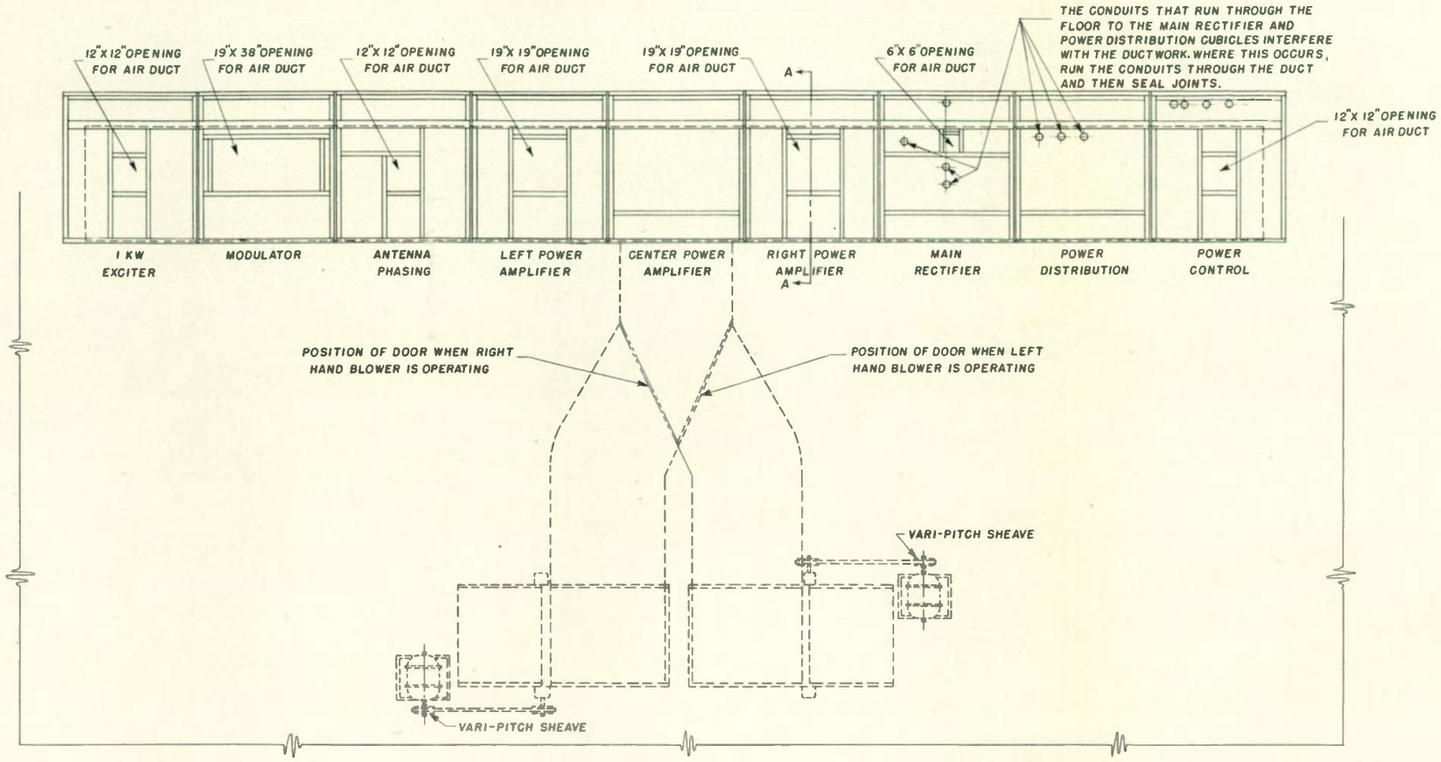
HOLE DESIGNATION

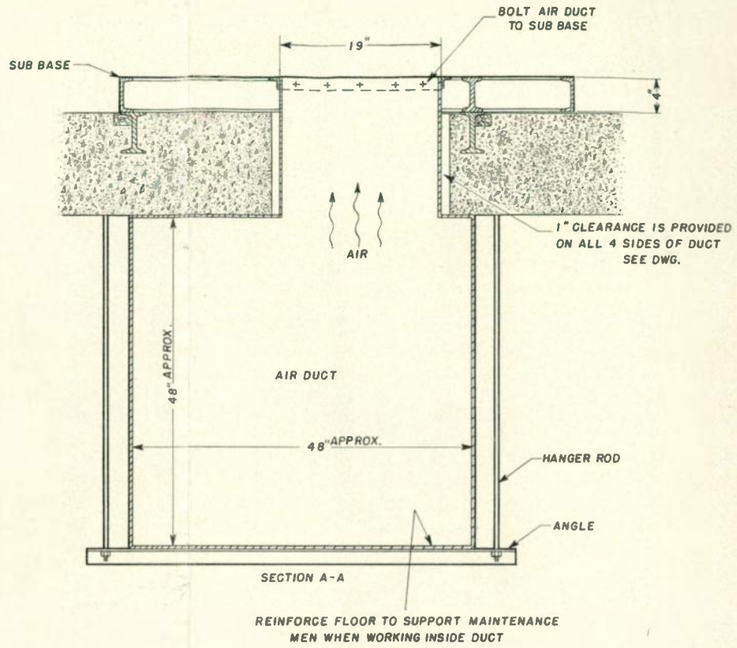
A 1 1/2" DIAM. FOR 1" CONDUIT TO AUDIO RACK. AUDIO INPUT TO TRANSMITTER.
B 4" DIAM. FOR 3" CONDUIT TO AUDIO RACKS & CONTROL CONSOLE.
C 3" DIAM. FOR 2" CONDUIT TO RECTIFIER TRANSFORMER.
D 1 1/4" DIAM. FOR 1/2" CONDUIT TO RECTIFIER NEGATIVE RETURN.
E 1 5/8" DIAM. FOR 3/4" CONDUIT TO FILTER CHOKE.
F 2 3/4" DIAM. HIGH VOLTAGE OPENING.
G 3" DIAM. FOR 2" CONDUIT TO MAIN RECTIFIER REGULATOR.
H 3" DIAM. FOR 2" CONDUIT TO DISTRIBUTION REGULATOR.
J 3" DIAM. FOR 2" CONDUIT TO 2300 VOLT SOURCE.
K 3" DIAM. FOR 2" CONDUIT TO REGULATOR FOR CONTROL.
L 3" DIAM. FOR 2" CONDUIT TO REGULATOR FOR CONTROL.
M 3" DIAM. FOR 2" CONDUIT TO DISTRIBUTION REGULATOR. 220 V, 3PH. CURRENT.
N 1 1/2" DIAM. FOR 1" CONDUIT TO DISTRIBUTION TRANSFORMER FOR 115 V. CONTROL.

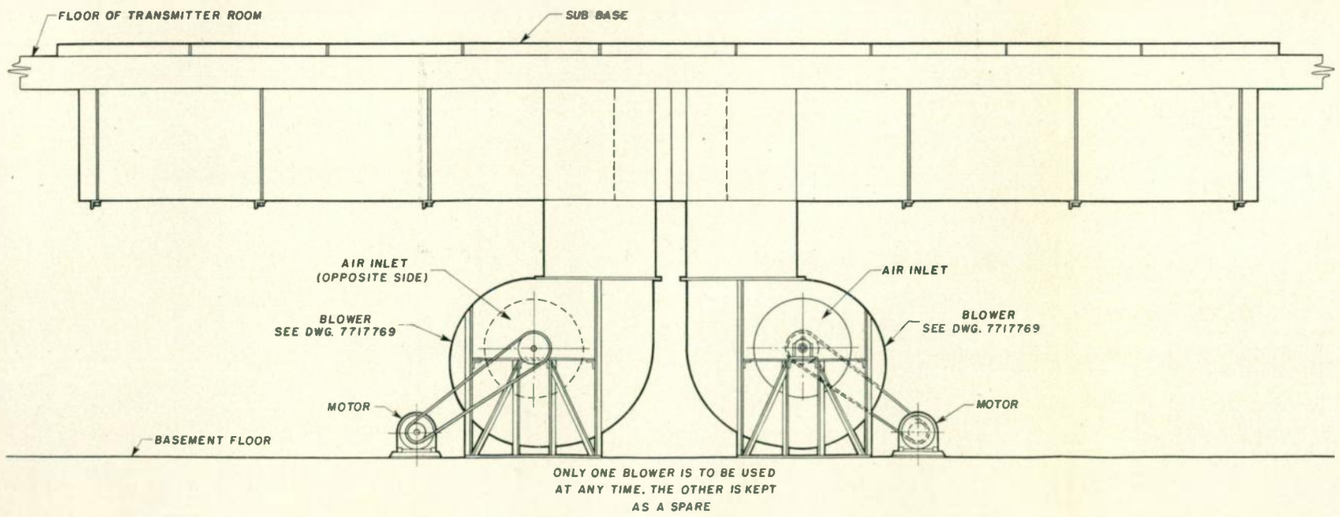
GENERAL NOTES

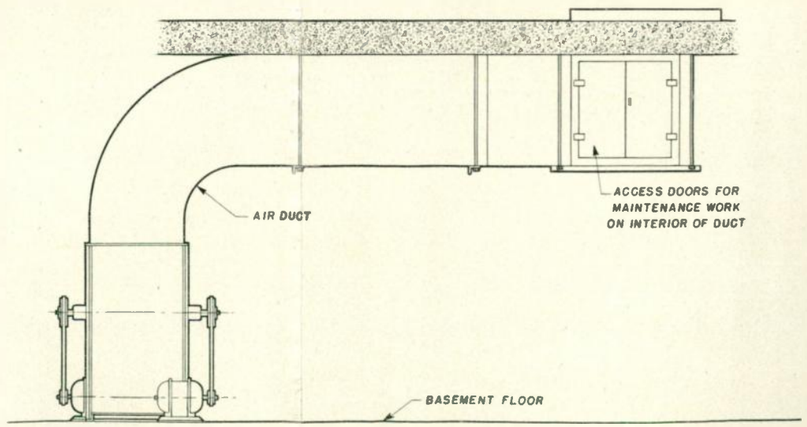
(1) PROVIDE 7 RECTANGULAR & 13 ROUND HOLES THROUGH FLOOR AS SHOWN.
(2) DESIGN FLOOR TO CARRY 4000 LBS. PER CUBICLE. (9 CUBICLES)
(3) EACH CUBICLE IS 4'-1/4" WIDE X 4'-6 1/4" DEEP X 6'-8 1/8" HIGH & RESTS ON A 4" HIGH SUB BASE. ALLOW 1/16" CLEARANCE BETWEEN CUBICLES.

POSSIBLE FLOOR PLANS FOR DESIGNS 1 AND 2
(Dwg. 7617138)

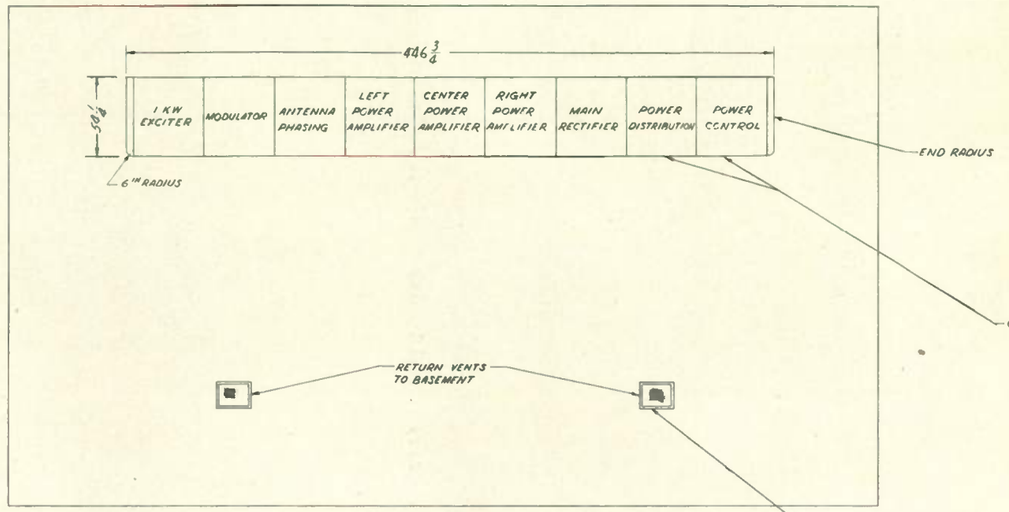


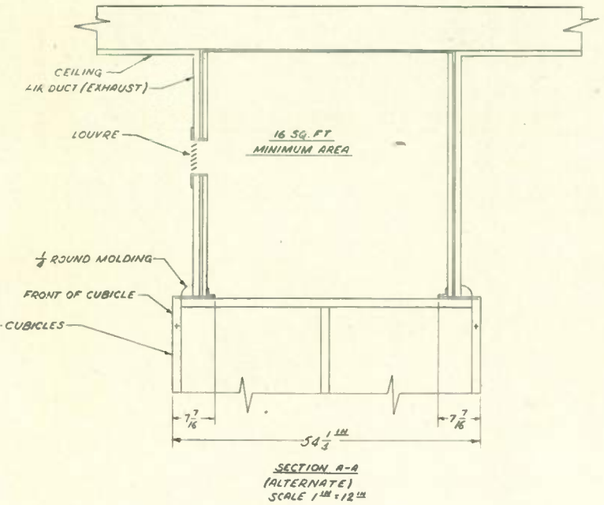




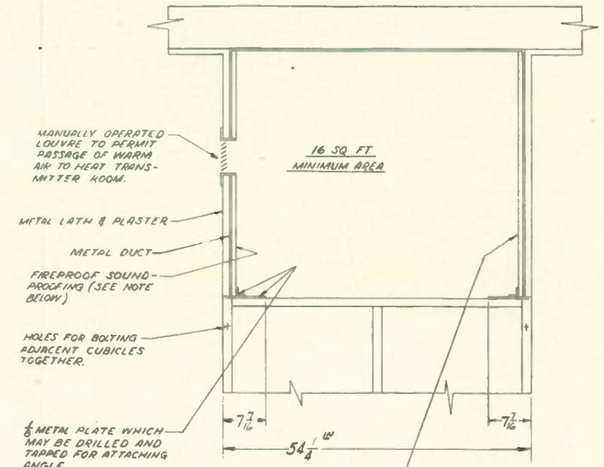


50 K.W. TRANSMITTER AIR SUPPLY DUCT FOR DESIGN 1 AND 2
(Dwg. 7617137)

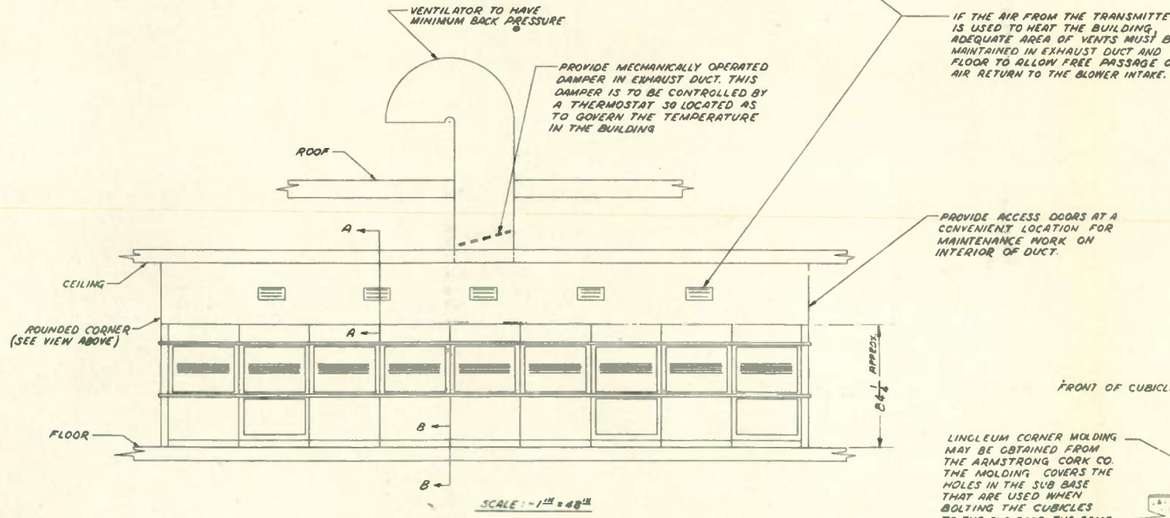




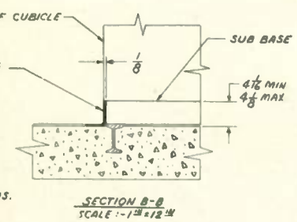
SECTION A-A (ALTERNATE)
SCALE 1" = 12"



SECTION A-A
SCALE 1" = 12"



SCALE :- 1" = 48"



SECTION B-B
SCALE :- 1" = 12"

GENERAL NOTES

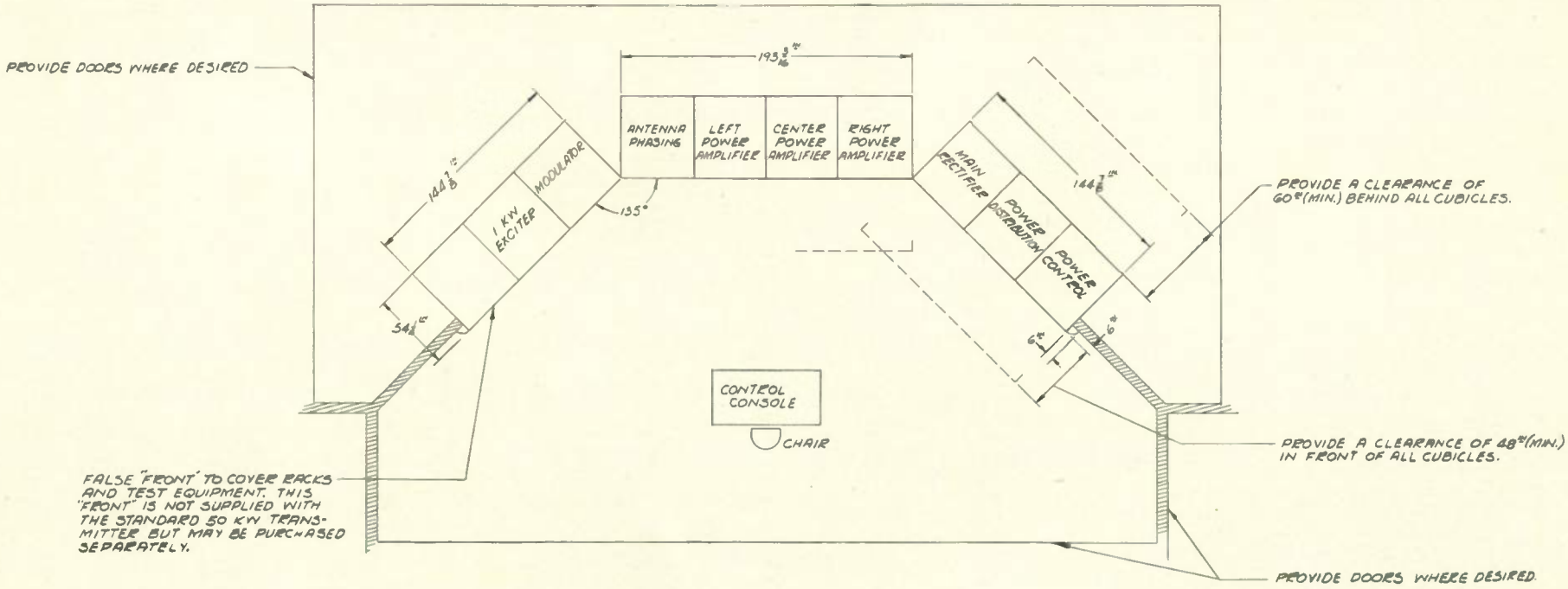
EACH CUBICLE IS 48 3/4" WIDE x 54 1/4 DEEP x 80 3/8 HIGH, WEIGHS APPROX. 6000 LBS. AND RESTS ON A 4" HIGH SUB BASE.

AIR EXHAUST SHOULD BE DIRECT AS PRACTICAL OF NOT LESS THAN 16 SQ. FT. AREA. THE AIR SHOULD EXHAUST ON OPPOSITE SIDES OF THE BUILDING SO AS TO TAKE ADVANTAGE OF LEEWARD SIDE OF PREVAILING WINDS. AS AN ALTERNATE, A ROOF VENTILATOR OF THE NO-BACK DRAFT TYPE COULD BE USED IN LIEU OF THE PRECEEDING SUGGESTION. THE VENTILATOR SHOWN IS ONLY ONE OF THE MANY DESIGNS THAT MAY BE INSTALLED.

THE SOUNDPROOFED EXHAUST DUCT SHOULD NOT BE INSTALLED UNTIL THE CUBICLES ARE IN PLACE. ONLY SOUNDPROOFING APPROVED BY THE FIRE UNDERWRITERS SHOULD BE USED.

50 K.W. TRANSMITTER AIR EXHAUST FOR DESIGN 1 AND 2
(Dwg. 7617149)

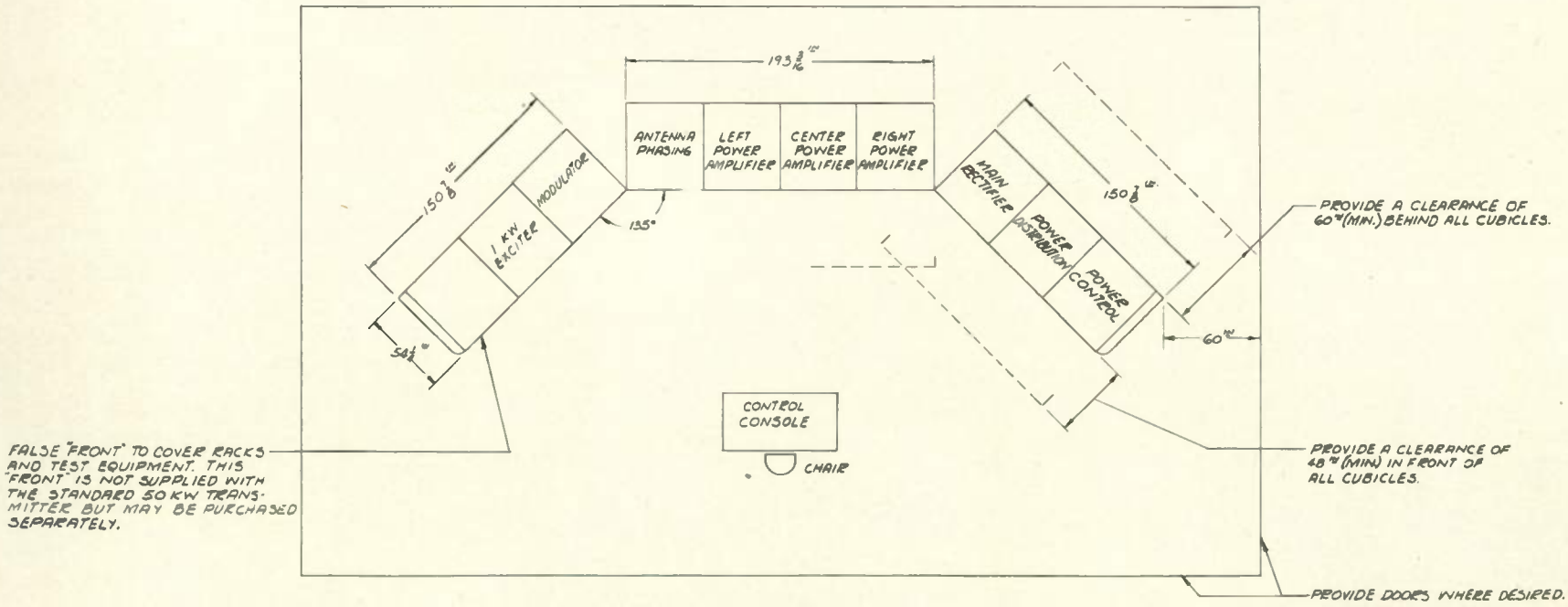
50 K.W. TRANSMITTER LAYOUT DESIGN 3
(Dwg. 7717768)



NOTES

EACH CUBICLE IS 48 1/2" WIDE X 54 1/2" DEEP X 80 1/8" HIGH AND RESTS ON A 4" HIGH SUB BASE & WEIGHS APPROX. 4000 LBS. AIR IS REQUIRED FOR ALL BUT TWO OF THE CUBICLES AND IS SUPPLIED BY DUCTS BELOW THE FLOOR. THE AIR TRAVELS THROUGH THE CUBICLE & EXHAUSTS AT THE TOP THEREFORE EXHAUST DUCTS ARE NECESSARY. THE EXHAUST DUCTS USUALLY EXTEND FROM THE TOP OF THE CUBICLE TO THE CEILING. FALSE DUCTS ARE GENERALLY BUILT ABOVE THE CUBICLES NOT REQUIRING AIR SIMPLY TO MAKE THE INSTALLATION SYMMETRICAL. (THE TWO CUBICLES NOT REQUIRING AIR ARE THE CENTER POWER AMPLIFIER AND THE POWER DISTRIBUTION.)

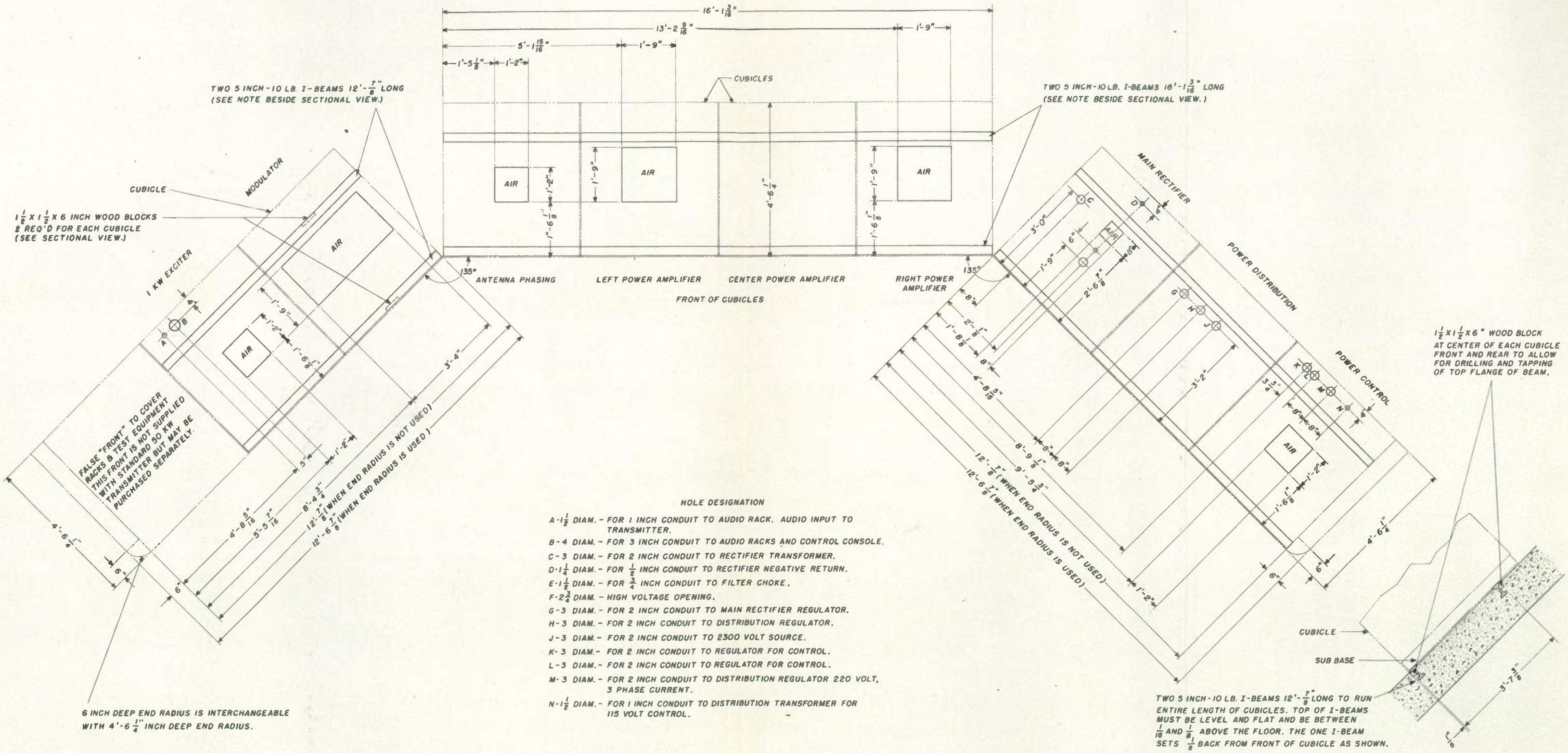
50 K.W. TRANSMITTER LAYOUT DESIGN 4
(Dwg. 7717767)



NOTES

EACH CUBICLE IS 48 3/4 WIDE X 54 1/2 DEEP X 80 1/8 HIGH & RESTS ON A 4" HIGH SUB BASE & WEIGHS APPROX. 4000 LBS.

AIR IS REQUIRED FOR ALL BUT TWO OF THE CUBICLES AND IS SUPPLIED BY DUCTS BELOW THE FLOOR. THE AIR TRAVELS THROUGH THE CUBICLES AND EXHAUSTS AT THE TOP THEREFORE EXHAUST DUCTS ARE NECESSARY. THE EXHAUST DUCTS USUALLY EXTEND FROM THE TOP OF THE CUBICLE TO THE CEILING. FALSE DUCTS ARE GENERALLY BUILT ABOVE THE CUBICLES NOT REQUIRING AIR SIMPLY TO MAKE THE INSTALLATION SYMMETRICAL. (THE TWO CUBICLES NOT REQUIRING AIR ARE THE CENTER POWER AMPLIFIER AND THE POWER DISTRIBUTION.)



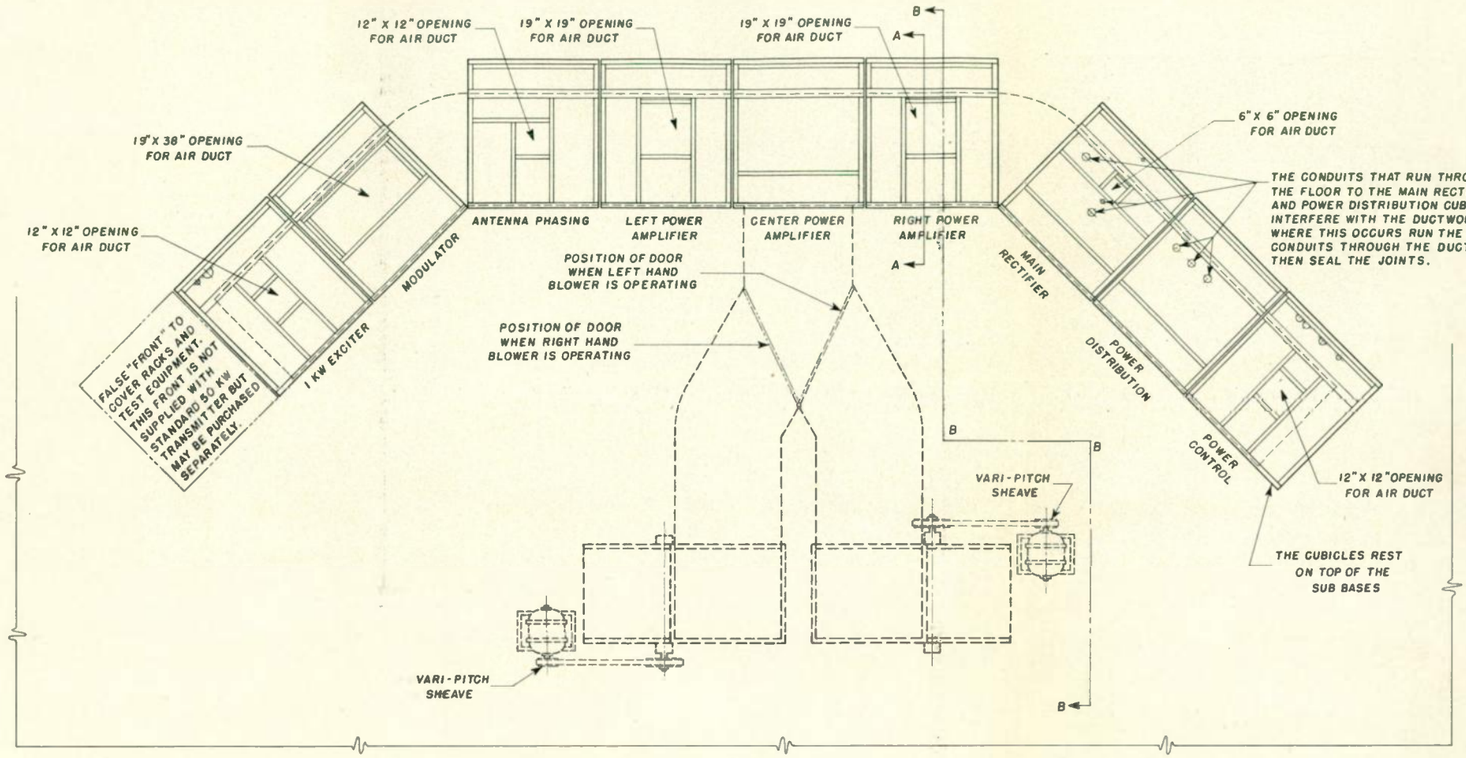
HOLE DESIGNATION

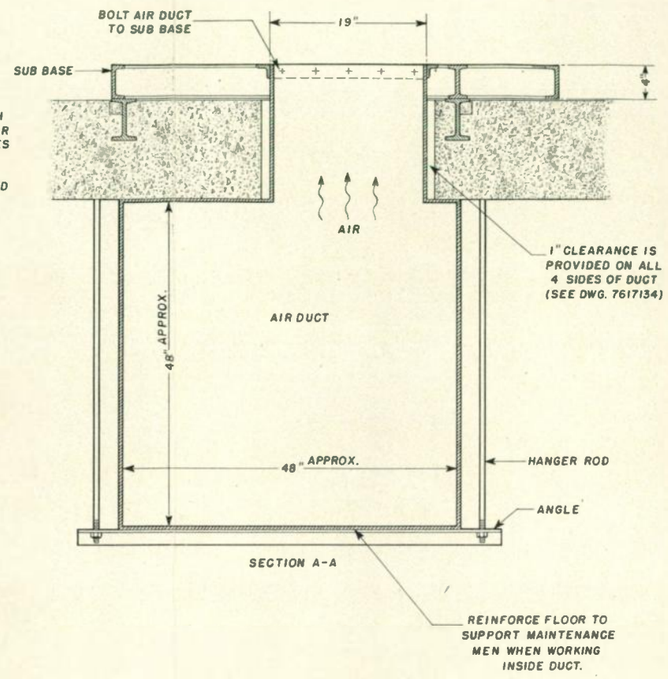
- A-1 1/2 DIAM. - FOR 1 INCH CONDUIT TO AUDIO RACK. AUDIO INPUT TO TRANSMITTER.
- B-4 DIAM. - FOR 3 INCH CONDUIT TO AUDIO RACKS AND CONTROL CONSOLE.
- C-3 DIAM. - FOR 2 INCH CONDUIT TO RECTIFIER TRANSFORMER.
- D-1 1/4 DIAM. - FOR 1/8 INCH CONDUIT TO RECTIFIER NEGATIVE RETURN.
- E-1 1/2 DIAM. - FOR 3/4 INCH CONDUIT TO FILTER CHOKE.
- F-2 3/4 DIAM. - HIGH VOLTAGE OPENING.
- G-3 DIAM. - FOR 2 INCH CONDUIT TO MAIN RECTIFIER REGULATOR.
- H-3 DIAM. - FOR 2 INCH CONDUIT TO DISTRIBUTION REGULATOR.
- J-3 DIAM. - FOR 2 INCH CONDUIT TO 2300 VOLT SOURCE.
- K-3 DIAM. - FOR 2 INCH CONDUIT TO REGULATOR FOR CONTROL.
- L-3 DIAM. - FOR 2 INCH CONDUIT TO REGULATOR FOR CONTROL.
- M-3 DIAM. - FOR 2 INCH CONDUIT TO DISTRIBUTION REGULATOR 220 VOLT, 3 PHASE CURRENT.
- N-1 1/2 DIAM. - FOR 1 INCH CONDUIT TO DISTRIBUTION TRANSFORMER FOR 115 VOLT CONTROL.

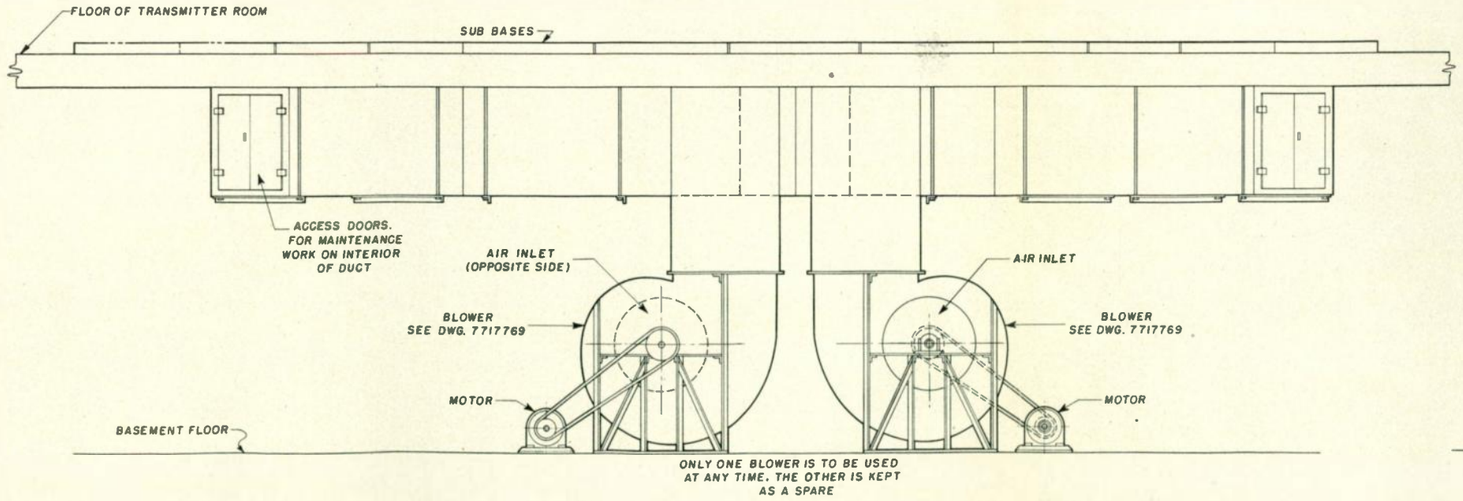
GENERAL NOTES

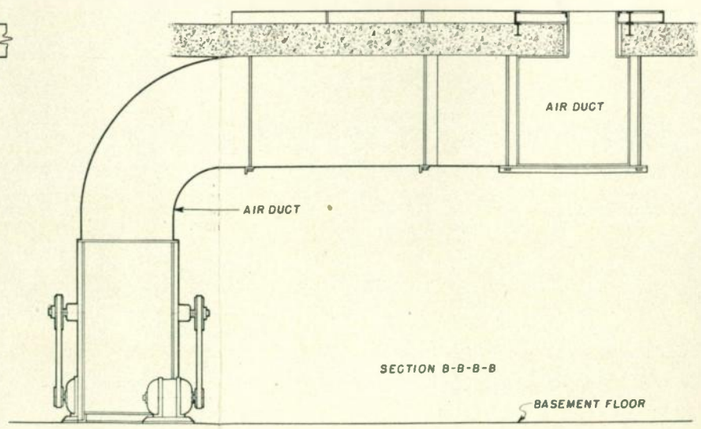
PROVIDE 7 RECTANGULAR AND 13 ROUND HOLES TROUGH FLOOR AS SHOWN. DESIGN FLOOR TO CARRY 4000 POUNDS PER CUBICLE. (9 CUBICLES) EACH CUBICLE IS 4'-1/4" WIDE X 4'-6 1/4" DEEP X 6'-8 1/8" HIGH AND RESTS ON A 4 INCH HIGH SUB BASE. ALLOW 1/16 CLEARANCE BETWEEN CUBICLES

POSSIBLE FLOOR PLANS FOR DESIGN 3 AND 4
(Dwg. 7617134)

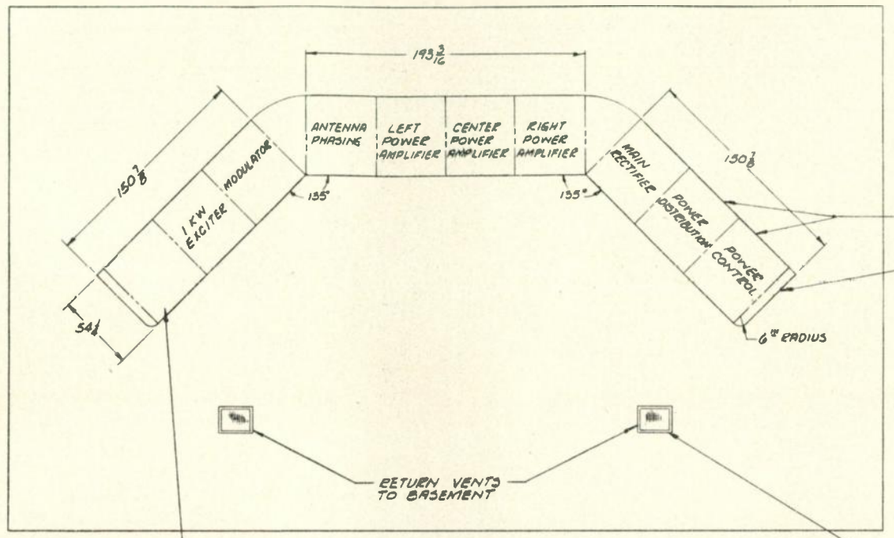


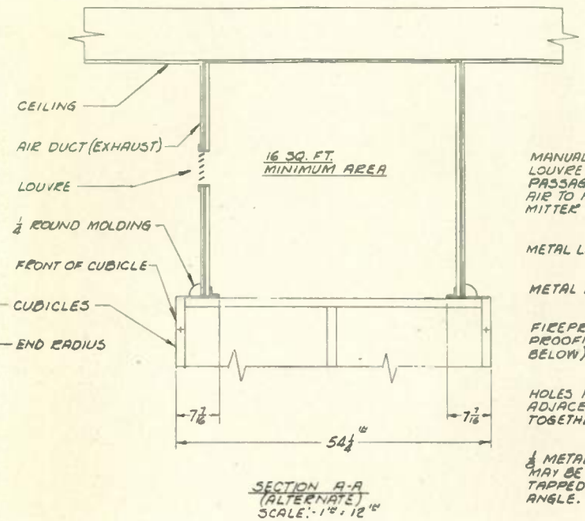




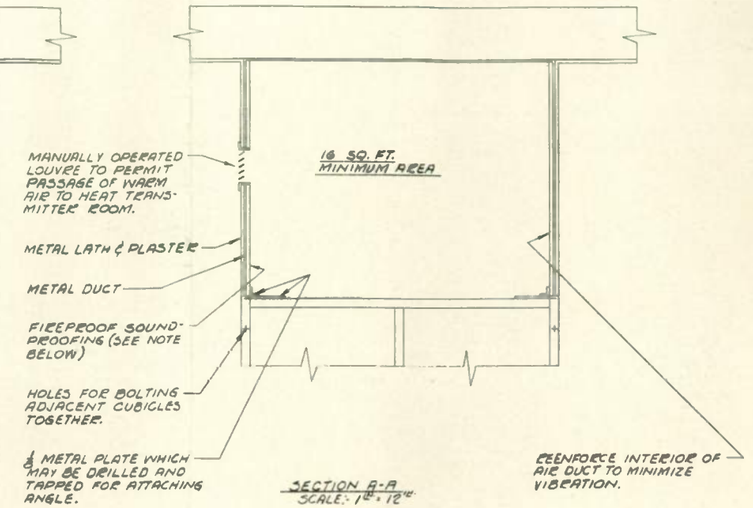


50 K.W. TRANSMITTER AIR SUPPLY DUCT FOR DESIGNS 3 AND 4
(Dwg. 7617135)





SECTION A-A (ALTERNATE)
SCALE:- 1" = 12"



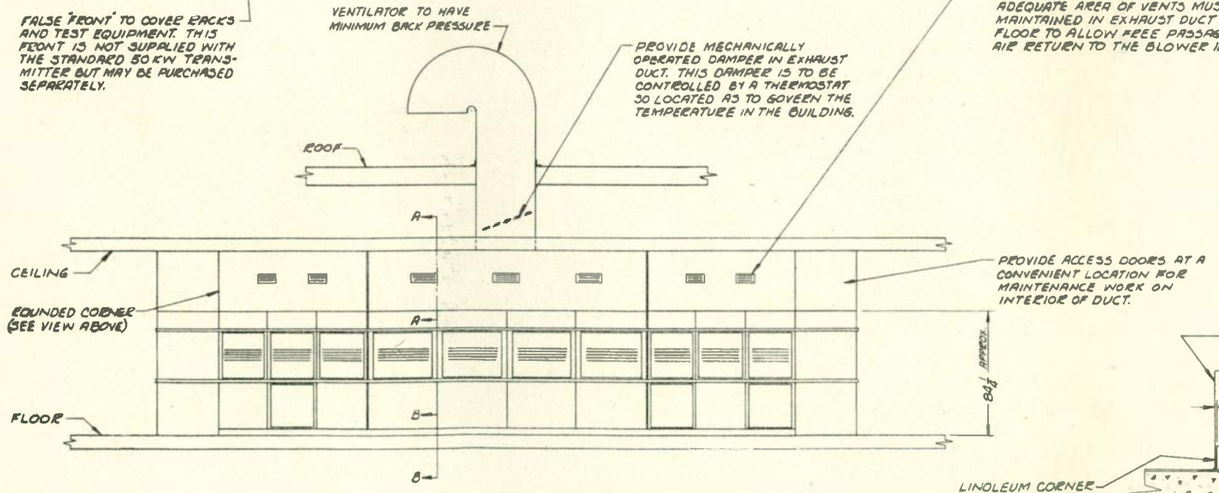
SECTION A-A
SCALE:- 1" = 12"

FALSE "FRONT" TO COVER RACKS AND TEST EQUIPMENT. THIS FRONT IS NOT SUPPLIED WITH THE STANDARD 50 KW TRANSMITTER BUT MAY BE PURCHASED SEPARATELY.

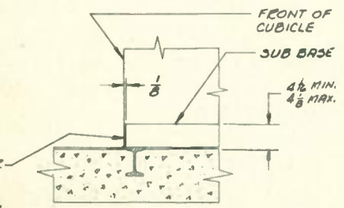
VENTILATOR TO HAVE MINIMUM BACK PRESSURE

PROVIDE MECHANICALLY OPERATED DAMPER IN EXHAUST DUCT. THIS DAMPER IS TO BE CONTROLLED BY A THERMOSTAT SO LOCATED AS TO GOVERN THE TEMPERATURE IN THE BUILDING.

IF THE AIR FROM THE TRANSMITTER IS USED TO HEAT THE BUILDING, ADEQUATE AREA OF VENTS MUST BE MAINTAINED IN EXHAUST DUCT AND FLOOR TO ALLOW FREE PASSAGE OF AIR RETURN TO THE BLOWER INTAKE.



SCALE:- 1" = 48"



SECTION B-B
SCALE:- 1" = 12"

LINOLEUM CORNER MOLDING MAY BE OBTAINED FROM THE ARMSTRONG CORK CO. THE MOLDING COVERS THE HOLES IN THE SUB BASE THAT ARE USED WHEN BOLTING THE CUBICLES TO THE SUB BASE. THE SAME MOLDING MAY BE USED IN THE REAR OF THE CUBICLES BUT NONE IS REQUIRED FOR THE TWO ENDS.

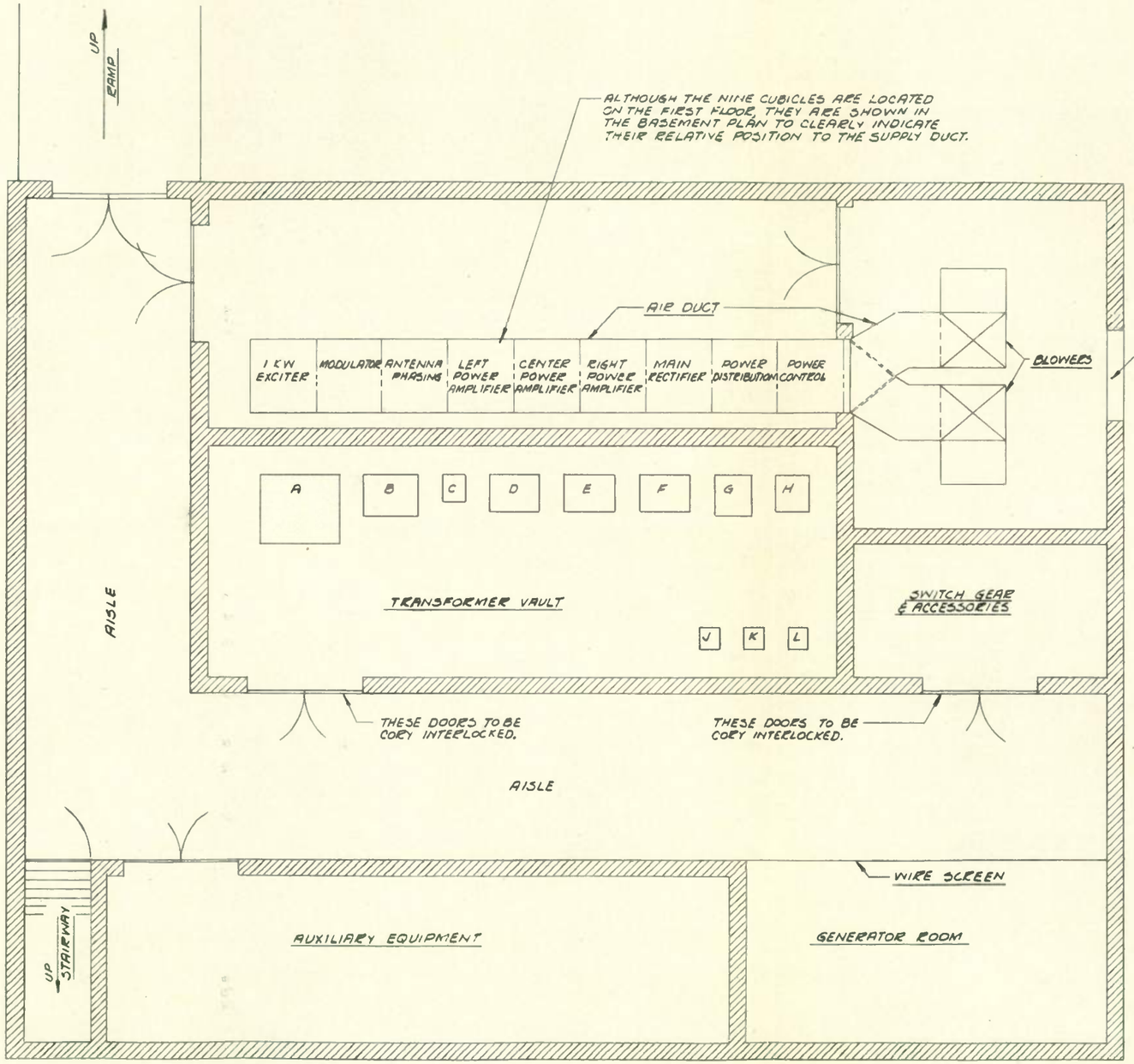
GENERAL NOTES

EACH CUBICLE IS 48 1/4" WIDE X 54 1/2" DEEP X 80 1/8" HIGH, WEIGHS APPROX. 4000 LBS., AND RESTS ON A 4" HIGH SUB BASE.

AIR EXHAUST SHOULD BE DIRECT AS PRACTICAL OF NOT LESS THAN 16 SQ. FT. AREA. THE AIR SHOULD EXHAUST ON OPPOSITE SIDES OF THE BUILDING SO AS TO TAKE ADVANTAGE OF LEEWARD SIDE OF PREVAILING WINDS. AS AN ALTERNATE, A ROOF VENTILATOR OF THE NO-BACK DRAFT TYPE COULD BE USED IN LIEU OF THE PRECEEDING SUGGESTION. THE VENTILATOR SHOWN IS ONLY ONE OF THE MANY DESIGNS THAT MAY BE INSTALLED.

THE SOUNDPROOFED EXHAUST DUCT SHOULD NOT BE INSTALLED UNTIL THE CUBICLES ARE IN PLACE. ONLY SOUNDPROOFING APPROVED BY THE FIRE UNDERWRITERS SHOULD BE USED.

50 K.W. TRANSMITTER AIR EXHAUST FOR DESIGNS 3 AND 4
(Dwg. 7617136)



BASEMENT PLAN

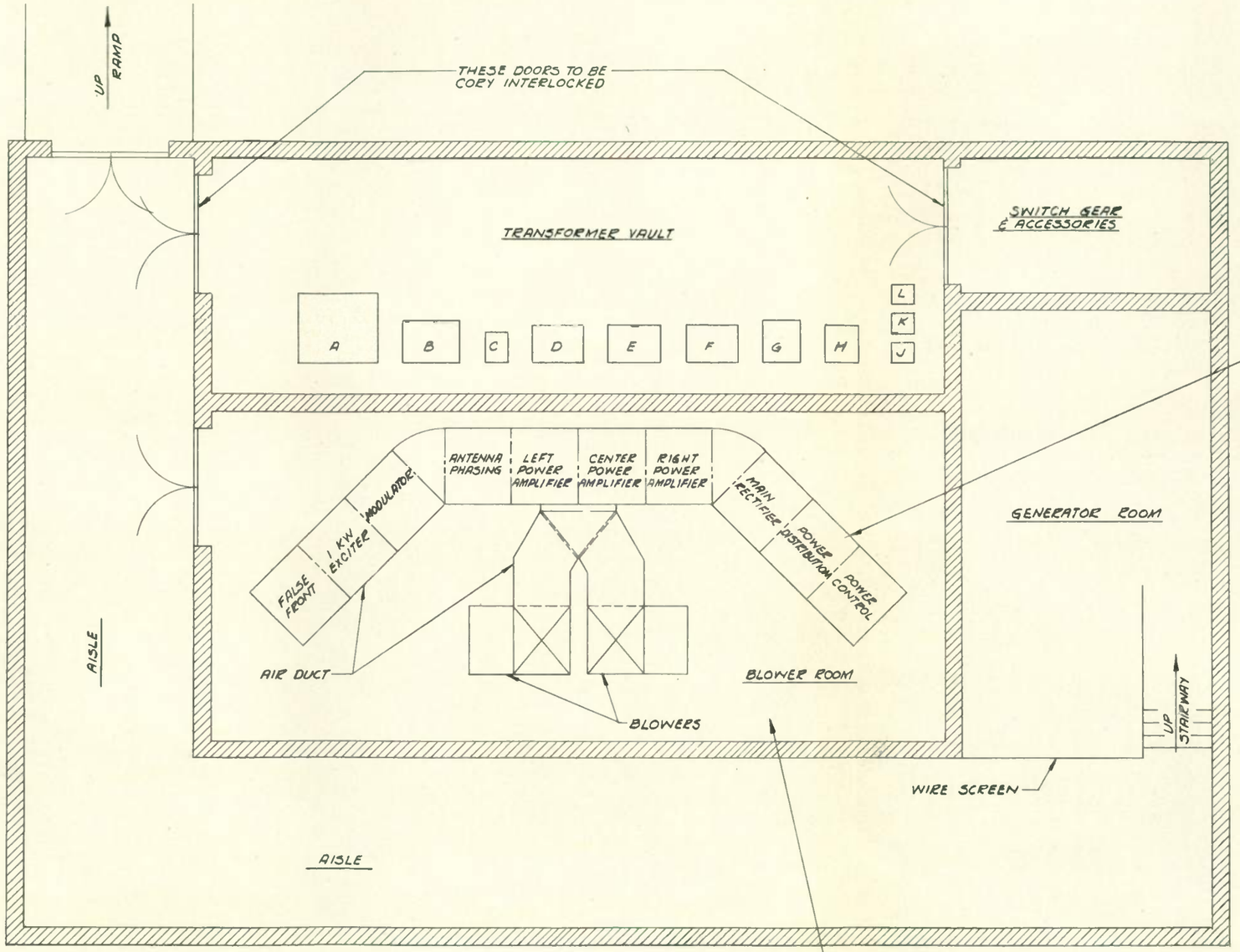
TRANSFORMER VAULT KEY

- A MODULATION TRANSFORMER
- B MODULATION CHOKE
- C MAIN RECTIFIER FILTER CHOKE
- D, E, F } MAIN RECTIFIER PLATE TRANSFORMERS
- G MAIN RECTIFIER VOLTAGE REGULATOR
- H DISTRIBUTION BUS VOLTAGE REGULATOR
- J, K, L } DISTRIBUTION TRANSFORMERS

GENERAL NOTES

IF THE AIR FROM THE CUBICLES IS USED TO HEAT THE BUILDING, PROVIDE RETURN DUCTS TO THE BLOWER ROOM.

TRANSFORMER VAULT LAYOUT FOR DESIGNS 1 AND 2
(Dwg. 7614628)



BASEMENT PLAN

ALTHOUGH THE NINE CUBICLES ARE LOCATED ON THE FIRST FLOOR, THEY ARE SHOWN IN THE BASEMENT PLAN TO CLEARLY INDICATE THEIR RELATIVE POSITION TO THE SUPPLY DUCT

PROVIDE WESTINGHOUSE PRECIPITRON OR OTHER SUITABLE FILTER TO FILTER THE INCOMING AIR. A SUPPLY DUCT MUST BE PROVIDED FROM THE EXTERIOR OF THE BUILDING TO THE BLOWER ROOM.

TRANSFORMER VAULT KEY

- A MODULATION TRANSFORMER.
- B MODULATION CHOKE.
- C MAIN RECTIFIER FILTER CHOKE.
- D, E, F } MAIN RECTIFIER PLATE TRANSFORMERS.
- G MAIN RECTIFIER VOLTAGE REGULATOR
- H DISTRIBUTION BUS VOLTAGE REGULATOR.
- J, K, L } DISTRIBUTION TRANSFORMERS.

GENERAL NOTES

IF THE AIR FROM THE CUBICLES IS USED TO HEAT THE BUILDING, PROVIDE RETURN DUCTS TO THE BLOWER ROOM.

TRANSFORMER VAULT LAYOUT FOR DESIGNS 3 AND 4
(Dwg. 7617169)

STANDARD DESIGNATION OF FANS

ROTATION - FOR CLARITY, THE WORDS "CLOCKWISE" & "COUNTER-CLOCKWISE" HAVE BEEN ADOPTED. FACING THE DRIVING SIDE OF A FAN, IF THE PROPER DIRECTION OF ROTATION IS CLOCKWISE, THE FAN OR WHEEL IS DESIGNATED AS CLOCKWISE. IF THE PROPER DIRECTION OF ROTATION IS COUNTER-CLOCKWISE, THE DESIGNATION IS COUNTER-CLOCKWISE. THE DRIVING SIDE OF A SINGLE INLET FAN IS CONSIDERED TO BE THE SIDE OPPOSITE THE INLET, REGARDLESS OF THE ACTUAL LOCATION OF THE DRIVE.

DISCHARGE - THE DISCHARGE OF A FAN IS DETERMINED BY THE DIRECTION OF THE LINE OF AIR DISCHARGE & ITS RELATION TO THE FAN SHAFT AS FOLLOWS:
BOTTOM HORIZONTAL - THE LINE OF AIR DISCHARGE IS HORIZONTAL & BELOW THE SHAFT.
TOP HORIZONTAL - THE LINE OF AIR DISCHARGE IS HORIZONTAL & ABOVE THE SHAFT.
UP-BLAST - THE LINE OF AIR DISCHARGE IS VERTICALLY UP.
DOWN-BLAST - THE LINE OF AIR DISCHARGED IS VERTICALLY DOWN.
ALL INTERMEDIATE POSITIONS OF THE FAN HOUSING ARE DESIGNATED AS ANGULAR DISCHARGE, SPECIFYING THE ANGLE MADE BY THE LINE OF AIR DISCHARGE WITH THE HORIZONTAL (SEE DIAGRAM).

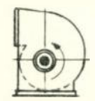


FIG. 1
COUNTER-CLOCKWISE
TOP HORIZONTAL

FIG. 2
CLOCKWISE
TOP HORIZONTAL

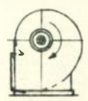


FIG. 3
CLOCKWISE
BOTTOM
HORIZONTAL

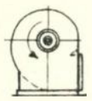


FIG. 4
COUNTER-CLOCKWISE
BOTTOM HORIZONTAL

FIG. 5
CLOCKWISE
UP BLAST

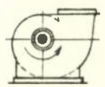


FIG. 6
COUNTER-CLOCKWISE
UP-BLAST

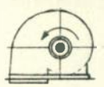


FIG. 7
COUNTER-
CLOCKWISE
DOWN BLAST

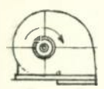


FIG. 8
CLOCKWISE
DOWN BLAST

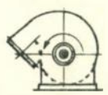


FIG. 9
COUNTER-CLOCKWISE
TOP ANGULAR DOWN

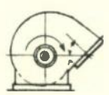


FIG. 10
CLOCKWISE
TOP ANGULAR
DOWN

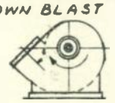


FIG. 11
CLOCKWISE
BOTTOM
ANGULAR UP

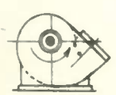


FIG. 12
COUNTER-CLOCKWISE
BOTTOM ANGULAR UP

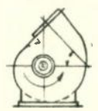


FIG. 13
COUNTER-CLOCKWISE
TOP ANGULAR UP

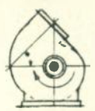
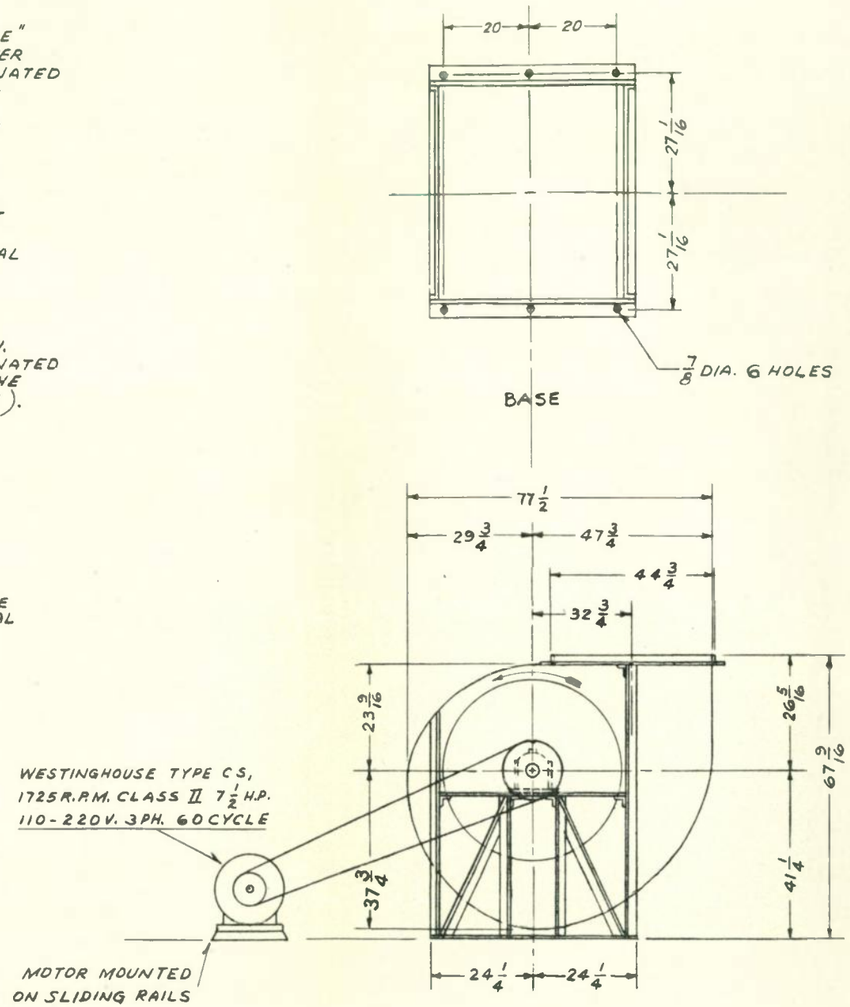
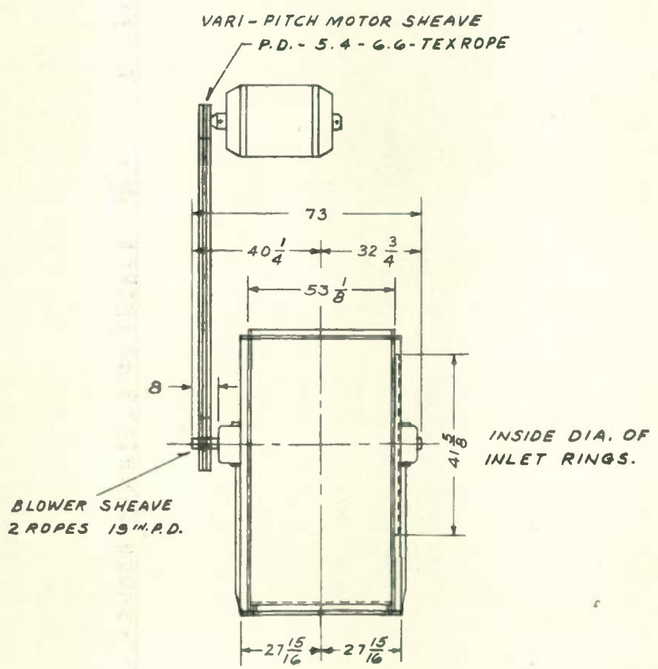


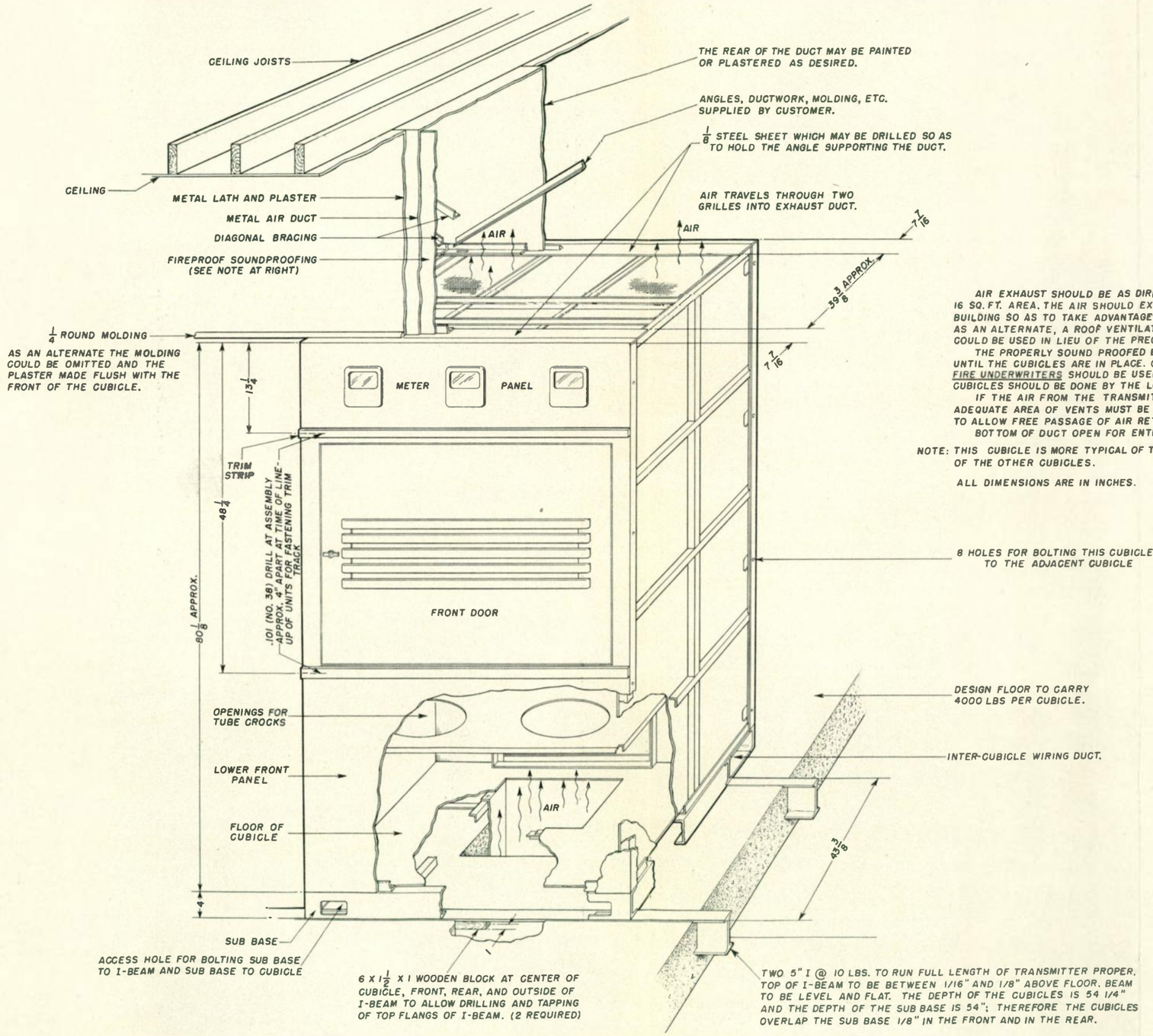
FIG. 14
CLOCKWISE
TOP ANGULAR UP





B.F. STURTEVANT CO.
SILENTVANE FAN DESIGN - 8
SIZE - 95
SINGLE WIDTH SINGLE INLET
COUNTER-CLOCKWISE UP BLAST DISCHARGE
ARRANGEMENT 3
OTHER BLOWER ARRANGEMENTS SEE LEFT SIDE OF DWG.

BLOWER LAYOUT
(Dwg. 7717769)



AIR EXHAUST SHOULD BE AS DIRECT AS POSSIBLE AND NOT LESS THAN 16 SQ. FT. AREA. THE AIR SHOULD EXHAUST ON OPPOSITE SIDES OF THE BUILDING SO AS TO TAKE ADVANTAGE OF LEEWARD SIDE OF PREVAILING WINDS. AS AN ALTERNATE, A ROOF VENTILATOR OF THE NO-BACK DRAFT TYPE COULD BE USED IN LIEU OF THE PRECEDING SUGGESTION.

THE PROPERLY SOUND PROOFED EXHAUST DUCT SHOULD NOT BE INSTALLED UNTIL THE CUBICLES ARE IN PLACE. ONLY SOUND PROOFING APPROVED BY THE FIRE UNDERWRITERS SHOULD BE USED. THE FITTING OF THE DUCT TO THE CUBICLES SHOULD BE DONE BY THE LOCAL SHEETMETAL WORKERS.

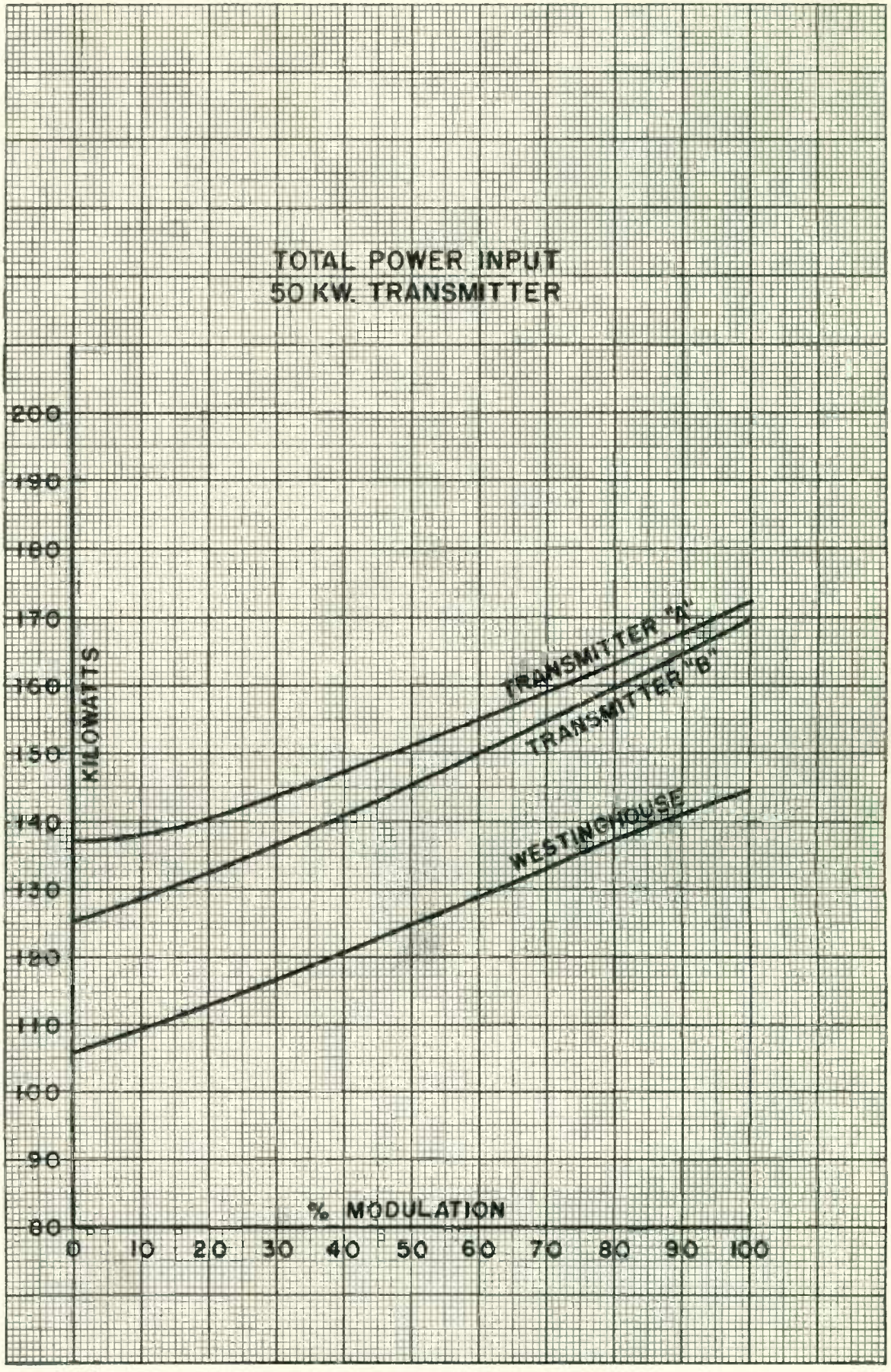
IF THE AIR FROM THE TRANSMITTER IS USED TO HEAT THE BUILDING, ADEQUATE AREA OF VENTS MUST BE MAINTAINED IN EXHAUST DUCT AND FLOOR TO ALLOW FREE PASSAGE OF AIR RETURN TO THE BLOWER INTAKE.

BOTTOM OF DUCT OPEN FOR ENTIRE LENGTH OF TRANSMITTER.

NOTE: THIS CUBICLE IS MORE TYPICAL OF THE RIGHT HAND POWER AMPLIFIER THAN OF THE OTHER CUBICLES.

ALL DIMENSIONS ARE IN INCHES.

TYPICAL 50 HG-1 CUBICLE
(Dwg. 7616762)



POWER CONSUMPTION COMPARISON CURVE
(Dwg. 263874-A)

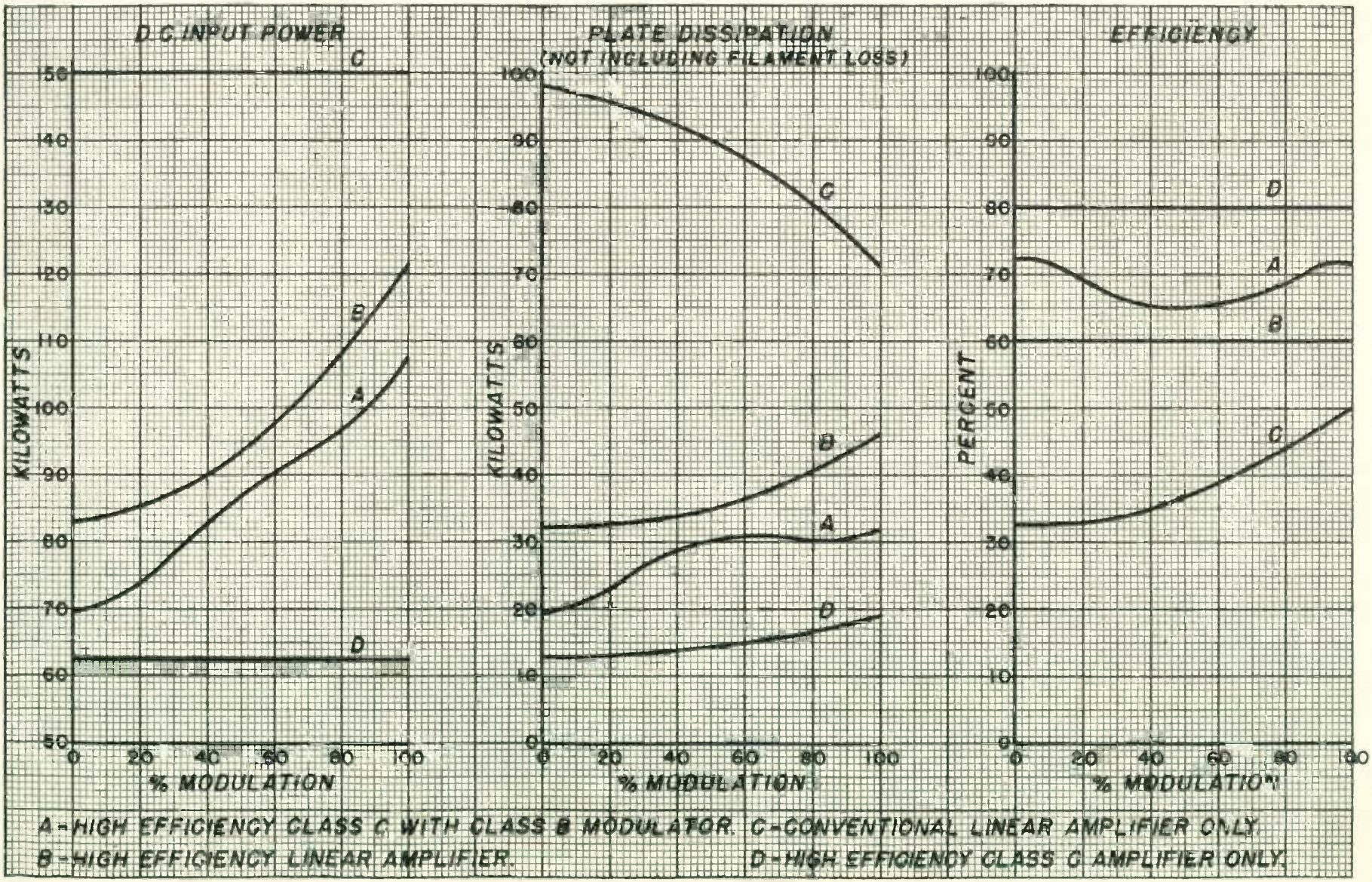
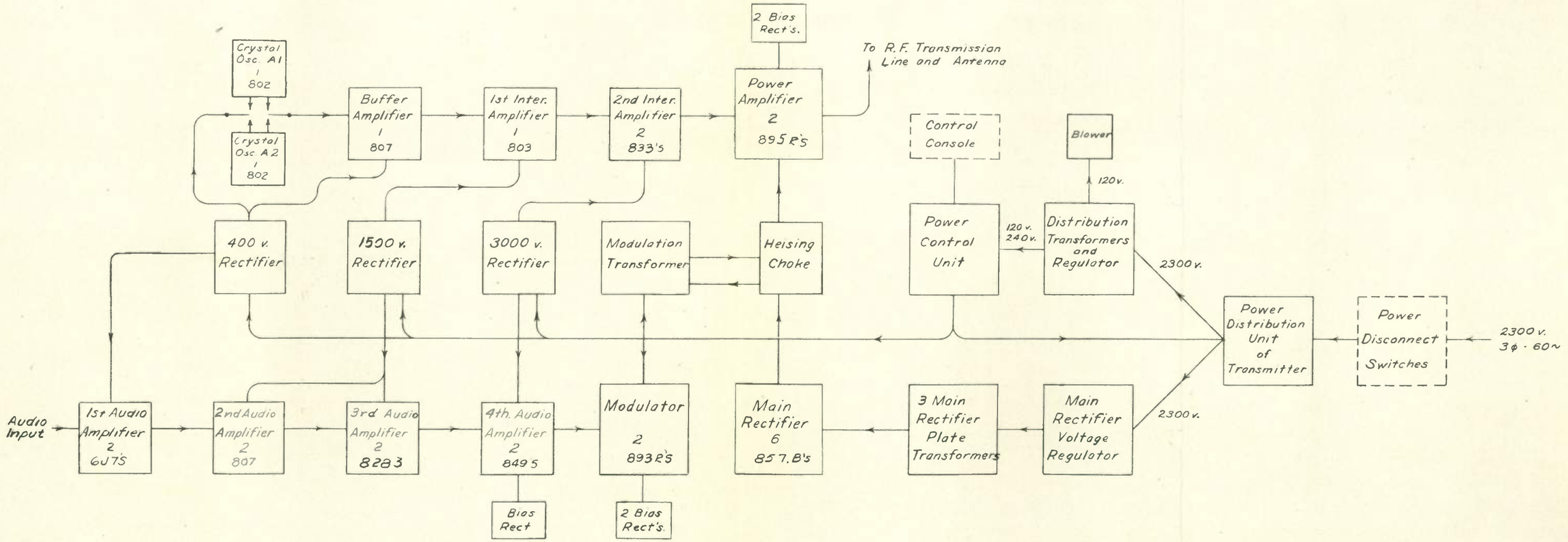


PLATE POWER, DISSIPATION AND EFFICIENCY COMPARISON CURVE
(Dwg. 263873-A)



BLOCK DIAGRAM
(Dwg. 7707288)

NO. 12-600 VOLT VCLC CABLE PDS 7275-1

ALL LENGTHS MEASURED IN FEET		INTER CUBICLE WIRE LENGTHS WITHIN CUBICLE			NUMBER OF INTER CUBICLE WIRES						TOTAL INTER CUBICLE WIRE LENGTHS WITHIN CUBICLES				TOTAL INTER CUBICLE WIRE LENGTHS BETWEEN CUBICLES			CUBICLE WIRE LENGTHS
		DIRECT *	ACROSS *	DOUBLE CROSS *	WHERE CUBICLE "1A IS ON THE RIGHT OF CUBICLE "1B IN INSTALLATION			WHERE CUBICLE "1A IS ON THE LEFT OF CUBICLE "1B IN INSTALLATION			LENGTH OF DIRECT WIRES	LENGTH OF ACROSS WIRES	LENGTH OF DOUBLE CROSS WIRES	TOTAL LENGTHS	DISTANCE BETWEEN CUBICLE "1A & CUBICLE "1B	NUMBER OF WIRES BETWEEN CUBICLES	TOTAL LENGTH OF INTER CUBICLE WIRES	SUM OF COLUMNS 4D & 5C
					DIRECT	ACROSS	DOUBLE CROSS	DIRECT	ACROSS	DOUBLE CROSS	PRODUCT OF 2A & 3A OR 2A & 3D	PRODUCT OF 2B & 3B OR 2B & 3E	PRODUCT OF 2C & 3C OR 2C & 3F	SUM OF 4A, 4B, & 4C	FROM INSTALLATION LAYOUT	SUM OF 3A, 3B, & 3C OR 3D, 3E, & 3F.	PRODUCT OF 5A & 5B	
1A	1B	2A	2B	2C	3A	3B	3C	3D	3E	3F	4A	4B	4C	4D	5A	5B	5C	6A
EXCITER	MODULATOR	6	10	14	6	5	2	2	5	6						13		
EXCITER	LEFT HAND P.A.	6	10	14														
EXCITER	CENTER P.A.	6	10	14														
EXCITER	RIGHT HAND P.A.	6	10	14														
EXCITER	POWER CONTROL	8	12	16	4	16	4	4	16	4						24		
EXCITER	POWER DIST.	6	10	14														
EXCITER	RECTIFIER	6	10	14														
EXCITER	ANTENNA PHAS.																	
MODULATOR	LEFT HAND P.A.	6	10	14	3					3						3		
MODULATOR	CENTER P.A.	6	10	14	5		1	1		5						6		
MODULATOR	RIGHT HAND P.A.	6	10	14														
MODULATOR	POWER CONTROL	8	12	16	2	15	1	1	15	2						18		
MODULATOR	POWER DIST.	6	10	14														
MODULATOR	RECTIFIER	6	10	14														
MODULATOR	ANTENNA PHAS.																	
LEFT HAND P.A.	CENTER P.A.	6	10	14	9	8			8	9						17		
LEFT HAND P.A.	RIGHT HAND P.A.	6	10	14			4	4								4		
LEFT HAND P.A.	POWER CONTROL	7	11	15		8			8							8		
LEFT HAND P.A.	POWER DIST.	5	9	13														
LEFT HAND P.A.	RECTIFIER	6	10	14														
LEFT HAND P.A.	ANTENNA PHAS.																	
CENTER P.A.	RIGHT HAND P.A.	6	10	14	9	7	2	2	7	9						18		
CENTER P.A.	POWER CONTROL	7	11	15		5	3	3	5							8		
CENTER P.A.	POWER DIST.	5	9	13		3			3							3		
CENTER P.A.	RECTIFIER	6	10	14	1	2			2	1						3		
CENTER P.A.	ANTENNA PHAS.																	
RIGHT HAND P.A.	POWER CONTROL	7	11	15	9	1			1	9						10		
RIGHT HAND P.A.	POWER DIST.	5	9	13														
RIGHT HAND P.A.	RECTIFIER	6	10	14	1	1			1	1						2		
RIGHT HAND P.A.	ANTENNA PHAS.																	
POWER CONTROL	POWER DIST.	7	11	15	1	6	5	5	6	1						12		
POWER CONTROL	RECTIFIER	7	11	15	6	5			5	6						11		
POWER CONTROL	ANTENNA PHAS.																	
POWER DIST.	RECTIFIER	5	9	13	1	2	2	2	2	1						5		
POWER DIST.	ANTENNA PHAS.																	
DESK	EXCITER	10			30			30								30		
DESK	MODULATOR	10			1			1								1		
DESK	LEFT HAND P.A.	10			2			2								2		
DESK	CENTER P.A.	10			6			6								6		
DESK	RIGHT HAND P.A.	10																
DESK	POWER CONTROL	12			2			2								2		
DESK	POWER DIST.	10																
DESK	RECTIFIER	10																
DESK	ANTENNA PHAS.	10																
POWER CONT.	MAIN RECT. REG.	2	6		7				7							7		
POWER CONT.	DIST. BUS REG.	2	6		8	3		3	8							11		
CENT. PWR AMP	MAIN RECT. REG.	2	6		4				4							4		

* "DIRECT"- LEAD DOES NOT PASS COMPLETELY ACROSS EITHER CUBICLE WHERE THE LEAD ORIGINATES OR TERMINATES.
# "ACROSS"- LEAD COMPLETELY CROSSES ONE OF THE CUBICLES WHERE THE LEAD ORIGINATES OR TERMINATES.
* "DOUBLE CROSS"-LEAD COMPLETELY CROSSES BOTH CUBICLES WHERE LEAD ORIGINATES AND TERMINATES.

INSTRUCTIONS

THIS DRAWING IS TO SERVE AS A GUIDE IN CALCULATING APPROXIMATE WIRE LENGTHS REQUIRED FOR INTER-CUBICLE WIRING. MOST OF THE WIRE USED IS THE NO. 12-VCLC-600 VOLT (P.D.S. 7275-1) WIRE AND THE CHART ON SHEET 2 WILL ASSIST IN ESTIMATING TOTAL LENGTH REQUIRED FOR A PARTICULAR STATION LAYOUT. IT IS USED AS FOLLOWS (ALL WIRE LENGTHS ARE IN FEET):

I. DETERMINE THE RELATIVE POSITION OF EACH CUBICLE WITH RESPECT TO THE OTHER CUBICLES.

II. FIRST CONSIDER THE INTER-CUBICLE WIRES FROM THE EXCITER UNIT TO THE MODULATOR UNIT (FIRST LINE).

A. IF EXCITER CUBICLE (COLUMN 1A) IS ON RIGHT SIDE OF MODULATOR CUBICLE (COLUMN 1B) IN LAYOUT:

1. INSERT PRODUCT OF FIGURES IN COLUMN 2A & 3A IN COLUMN 4A.
2. INSERT PRODUCT OF FIGURES IN COLUMN 2B & 3B IN COLUMN 4B.
3. INSERT PRODUCT OF FIGURES IN COLUMN 2C & 3C IN COLUMN 4C.

B IF EXCITER CUBICLE (COLUMN 1A) IS ON LEFT SIDE OF MODULATOR CUBICLE (COLUMN 1B) IN LAYOUT:

1. INSERT PRODUCT OF FIGURES IN COLUMN 2A & 3D IN COLUMN 4A.
2. INSERT PRODUCT OF FIGURES IN COLUMN 2B & 3E IN COLUMN 4B.
3. INSERT PRODUCT OF FIGURES IN COLUMN 2C & 3F IN COLUMN 4C.

C. INSERT SUM OF FIGURES IN COLUMNS 4A, 4B, & 4C IN COLUMN 4D.

D. INSERT DISTANCE BETWEEN TWO NEAREST EDGES OF THE EXCITER AND MODULATOR CUBICLES IN COLUMN 5A.

E. INSERT PRODUCT OF FIGURES IN COLUMNS 5A & 5B IN COLUMN 5C.

F. INSERT SUM OF FIGURES IN COLUMNS 4D & 5C IN COLUMN 6A. THIS REPRESENTS TOTAL LENGTH OF NO. 12-600 VOLT WIRES BETWEEN THE EXCITER & THE MODULATOR CUBICLES.

III REPEAT THIS PROCEDURE ON ALL LINES OF COLUMN 1A & 1B AND TOTAL OF ALL WIRES OF THIS TYPE IS FOUND BY TOTALING ALL LENGTHS IN COLUMN 6A. (SEE INTERCONNECTION SHEET, DRAWING 7810831).

IV SINCE THE REMAINING INTER-CUBICLE WIRES ARE FEW IN NUMBER AND DEPEND GREATLY ON THE DISTANCE BETWEEN CUBICLES, THEY ARE SIMPLY LISTED BELOW. (SEE DRAWING 7607067)

A. BUS- $\frac{1}{8}$ HARD DRAWN COPPER WATER PIPE & FITTINGS.

B. 3-CONDUCTOR NO. 8 V.C. AND LEAD COVERED 3000 VOLT CABLE, P.D.S 7275-4

C. 3-CONDUCTOR NO. 12 V.C. AND LEAD COVERED 9 KV CABLE. P.D.S 7275-5

D.

E.

F. NO. 12 V.C. & LEAD COVERED 2 CONDUCTOR 9 KV. CABLE, P.D.S 7275-5 (2 CONDUCTOR CABLE)

G. NO. 2 V.C & INSULATED 600 VOLT CABLE.

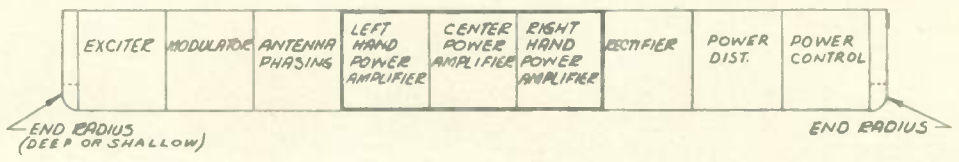
H. NO. 10-3500V. P.D.S. 7275-3 APPROX. 100 FT. (INTER-CUBICLE CONNECTION NO 2SG;257).

I.

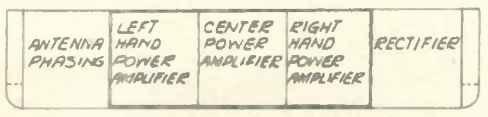
POSSIBLE STATION LAYOUTS

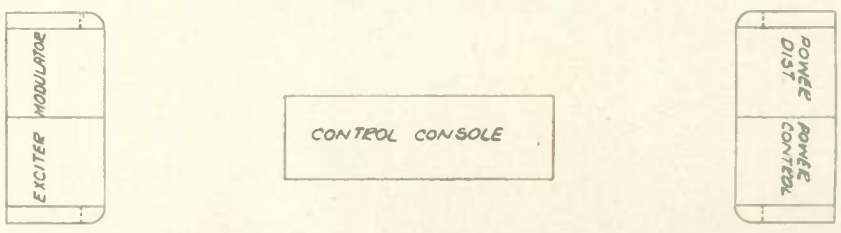
NO DETAILED STATION ARRANGEMENTS ARE GIVEN SINCE THE ARRANGEMENT DEPENDS ON A NUMBER OF FACTORS SUCH AS STATION HOUSE ARCHITECTURE, RELATIVE POSITION OF STATION TO ITS ANTENNA, ETC. ONE REQUIREMENT IS THAT THE THREE POWER AMPLIFIER CUBICLES MUST BE MOUNTED ADJACENT TO ONE ANOTHER. TWO POSSIBLE LAYOUTS ARE SHOWN BELOW.

A. STANDARD LAYOUT. (END RADII SUPPLIED)

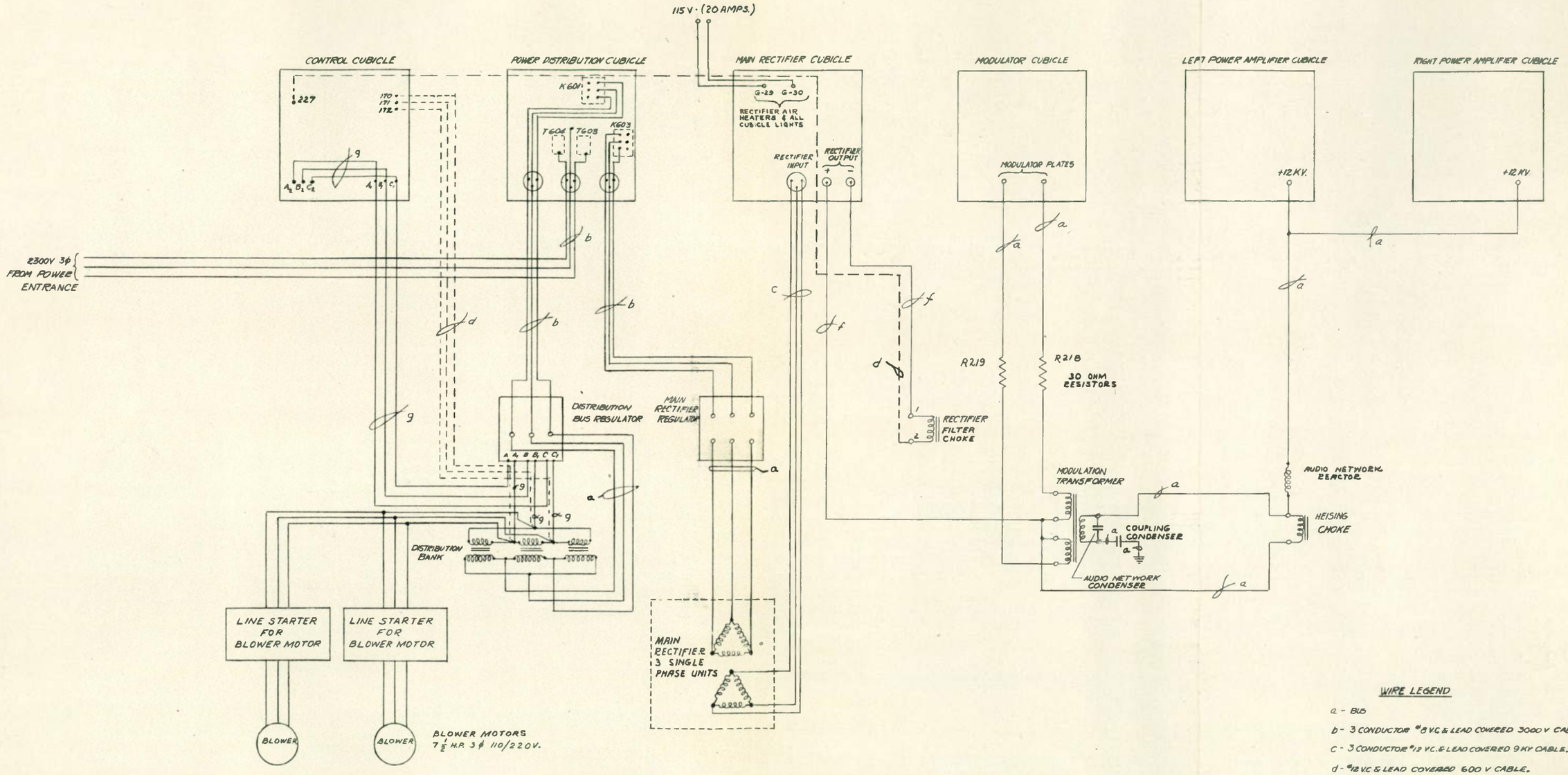


B. ALTERNATE





WIRE BILL INTER-CUBICLE
(Dwg. 7717359)



WIRE LEGEND

a - BUS

b - 3 CONDUCTOR #8 V.C. & LEAD COVERED 3000 V CABLE.

c - 3 CONDUCTOR #12 V.C. & LEAD COVERED 9 KV CABLE.

d - #12 V.C. & LEAD COVERED 600 V CABLE.

e -

f - #12 V.C. & LEAD COVERED 9 KV CABLE.

g - #2-V.C. AND LEAD COVERED 600 V CABLE.

NOTE: CONNECTIONS SHOWN IN BROKEN LINES ARE INCLUDED IN INTERCONNECTIONS, DWG. # 7810831

WIRE BILL POWER
(Dwg. 7607067)