

WESTINGHOUSE

INFORMATION BULLETIN

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WESTINGHOUSE HIGH FREQUENCY TUBES

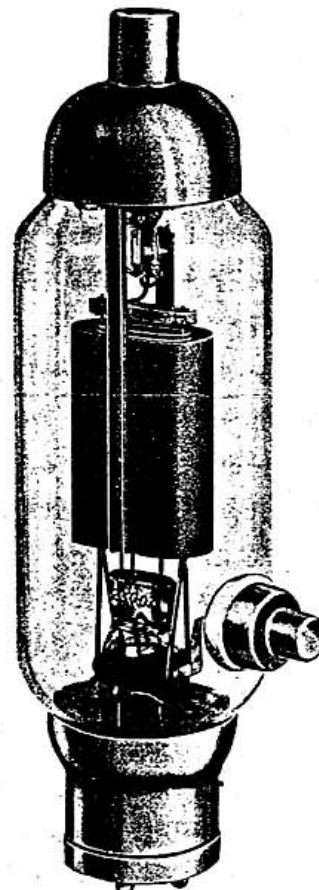
USES

Ever since Westinghouse pioneered a decade ago in showing that frequencies above 15 kilocycles (wave-lengths below 200 meters) had definite commercial value, the trend has been steadily toward a more and more extensive use of the higher frequencies. During the intervening years, several tubes have been developed by Westinghouse to meet the insistent demand for tubes capable of delivering larger amounts of power at the higher frequencies. Moreover, certain tubes of the standard types have been especially redesigned and modified for the more exacting requirements of the type of tube demanded.

Due to the inherent characteristics of these tubes, they are especially adaptable for use in experimental work with high-frequency circuits. From the many types of tubes now available it is possible to select one which will generate economically any amount of power, ranging from a few watts to many kilowatts. It is also possible to obtain adequate amounts of power for any field strength tests and for

the investigation of communication problems in this range of frequencies.

Westinghouse high-frequency tubes are used extensively in Governmental radio communication and in various other forms



WL-460, WL-464 HIGH FREQUENCY 200 WATT
OSCILLATOR AND AMPLIFIER

of communication operating below the usual broadcast band with which everyone is familiar.

Due to the fast increasing number of applications of extremely high frequencies and their commercial possibilities, the uses to which tubes of these characteristics can be applied are covering a wider range of services. Heating of metals is one of the important developments in this field. Metals enclosed in either gas-filled or evacuated chambers are heated by induced high frequency currents, without the contamination which accompanies the usual process of heating.

Much progress has been made in the treatment of bulk grain and dry cereals with the use of high frequency radiations to destroy weevils which cause heavy spoilage of these commodities.

The therapeutic properties of high frequency power have resulted in the rapid adoption of this new treatment medium by the medical profession. This has been brought about by the peculiar ability of high frequency or ultra short wave power to produce local heating at the source of deep seated bodily ailments with no overheating of the intervening flesh and skin. By the use of suitable circuits for the tubes and of auxiliary equipment the desired heating effects may be produced.

Intensive investigations have recently been undertaken in the specialized field of nuclear physics. The cyclotron oscillator has been employed to produce neutrons which, when combined with various

elements, produce radioactive materials. The large Westinghouse AW-200 tube can be used to supply the high frequency power demanded by the cyclotron for the necessary functioning of this apparatus.

DESCRIPTION

In keeping up with the advance in the greater utilization of the higher frequencies, Westinghouse has brought forth several tube improvements which are outstanding, notably the use of tantalum as a plate material where it proves advantageous. While most of these tubes bear some resemblance to previous models, there have been numerous changes incorporated in the designs to make them particularly adaptable to the new service. These changes, incorporated in these tubes for the first time, have been adopted only after their value was demonstrated during the course of extensive tests under actual operating conditions.

It has been possible to redesign the internal structure and particularly the lead arrangement so that only the shortest connections are needed between the oscillating circuit and the tube. This facilitates the construction of equipment which will operate at high frequencies or short wave-lengths with a minimum of dead-end or loss effects.

Wherever larger power outputs are required, it is practicable to operate two tubes in a push-pull circuit arrangement for high frequency service. By suitably positioning the tubes close to the oscil-

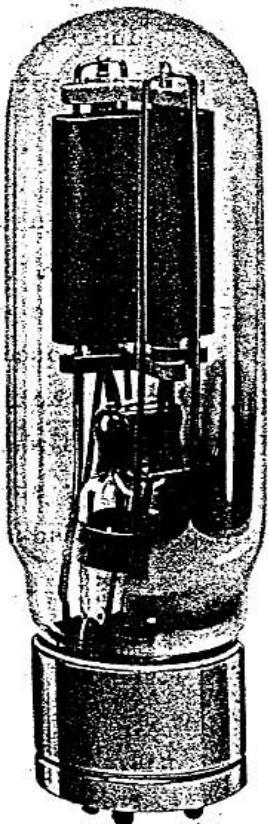
latory tank circuit it is possible to obtain reasonably high circuit efficiencies when operating at the highest practical frequencies.

All of these tubes are characterized by special design features which adapt them to particular fields of usefulness. The WL-195 and WL-196 tubes represent the highest development of any tube using this shape and size of bulb from which is attained high insulation and low interelectrode capacitance. The plates have been designed and constructed with generous dimensions making the tubes more reliable and stable in high frequency service. The grid of the WL-196 tube has been especially designed for a relatively high amplification factor compared to that of the WL-195 tube. This feature in the WL-196 tends to prevent the tube from drawing excessive plate current making the tube electrically self protecting even when the output circuit is not adjusted for optimum conditions.

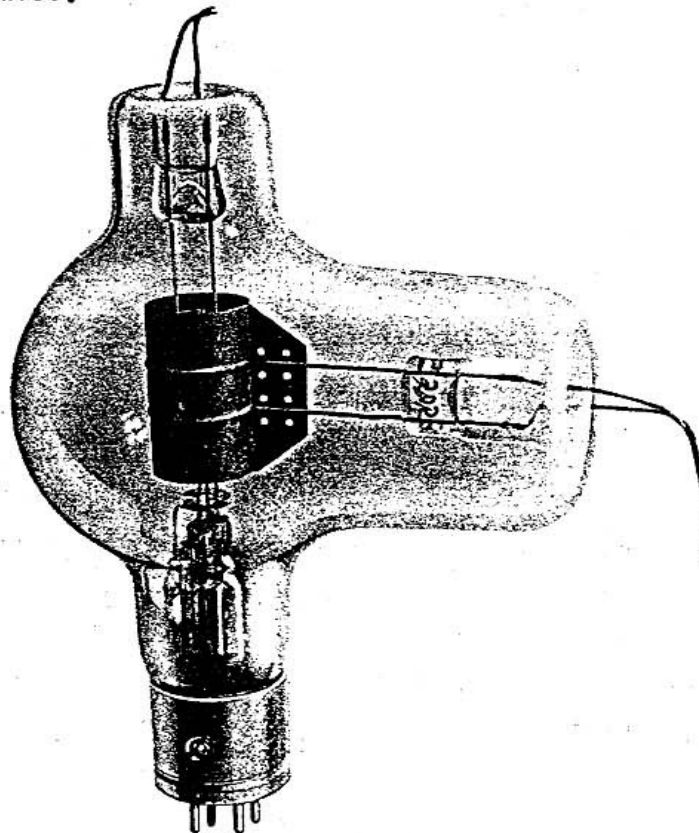
The size and reliability of the WL-211 tube commend its use for service in portable and inexpensive therapy equipments. It also has a wide range of applications in all types of general and high frequency radio oscillators and amplifiers. This tube incorporates improvements in the design of one of the oldest types of radio transmitting tubes.



AW-200 HIGH POWER
TUBE FOR CYCLOTRON
OSCILLATORS.



WL-211 GENERAL PURPOSE
OSCILLATOR AND AMPLIFIER.



WL-195, WL-196 HIGH FRE-
QUENCY TUBE FOR THERAPY
SERVICE.

The tungsten filament of the WL-455 tube assures long life under a wide variety of operating conditions. There is no loss of output caused by decreasing emission until the filament actually burns out. In addition, it is possible to operate the tube at reduced filament potentials with the result that the useful life of the tube is increased.

All parts of the WL-460 and WL-464 tubes have been designed from an electrical and mechanical standpoint primarily for high frequency or ultra short wave service with amplification factors of 18 and 60 respectively. The most suitable materials have been used for each component part. An ability to operate at high voltage has been obtained by suitably arranging the grid and plate leads, this facilitates the use of these tubes in circuits where short connecting leads are an advantage. These tubes are therefore particularly adaptable for use in therapy equipments ranging in size from small portable units to the larger types for office and hospital installations.

The use of rectifier tubes is strong-

ly recommended when stable operation is desired from oscillator circuits. The function of such tubes is to convert the incoming alternating current into direct current power which is more suitable for plate supply. By removing the voltage peaks, the rectifier tubes contribute definitely to the satisfactory operation of any equipment designed to use them. Another advantage derived from the use of rectifier tubes is the reduction in line current which results in higher efficiency due to the improved power factor of the supply circuit.

The AW-200 tube has been especially designed and constructed to deliver several kilowatts of power, particularly in high frequency applications above 50 megacycles. Because of the double end construction, the external circuit may be conveniently arranged in any of the conventional or special circuits able to operate in this frequency range. This construction also results in a minimum capacitance between electrodes due to the positioning of the filament and grid leads from opposite ends of the tube.

TYPICAL TECHNICAL DATA AND RATING AT 50 MEGACYCLES (6 Meters)

Tube Type	Filament		Plate		Amplification Factor	Typical Output at 6 Meters in Watts
	Volts	Amps.	Volts	Amps.		
WL-195	10	3.25	2000	0.14	12	155
WL-196	10	3.25	2000	0.14	35	155
AW-200	14.5	153.	7500	2.00	30	5000
WL-211	10	3.25	700	0.20	12	60
WL-455	10	11.0	1250	0.16	12	120
WL-460	10	3.85	2000	0.20	18	250
WL-464	10	3.85	2000	0.20	60	250

For prices and further information write to
 Special Products Sales Department,
 Westinghouse Lamp Company,
 Bloomfield, New Jersey.