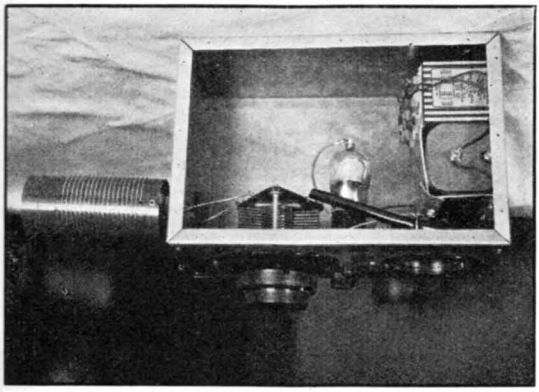
Bake the coils thoroughly dry and give them several coats of radio-frequency lacquer, preferably "Victron." Coil supports, jack insulators, and tube socket should be "Victron" sheet, although a good grade of bakelite is satisfactory. Single-turn coils of tubing should be lacquered to prevent corrosion.

Calibration can be taken from any calibrated source of r.f. power. An oscillating detector in zero-beat with a known source will serve. In this way the Bureau of Standards or the A.R.R.L. Standard Frequency stations can be used. Lecher wires are best at the ultra-high frequencies. *But keep the frequency-meter coil well away from all other circuits and objects during calibration and use.*

The parts cost, even when buying everything, should be under $35.00. Commercial units with the diode detector net about $100.00 when completely calibrated. The persistence of calibration can be made as good as with any other type by proper care in construction. A well-built job will last a long time if handled with even reasonable care.



VIEW OF THE PRODUCTION TYPE INSTRUMENT ILLUSTRATING THE INTERNAL CONSTRUCTION

There are many uses for these meters. Among them are such special jobs as checking harmonic content in the transmitted wave, antenna guy-wire oscillation, pickup in light and power wiring, relative field strength, etc. The detector alone, with the condenser set at minimum, makes a nice a.c. peak voltmeter. Because of the extreme sensitivity, much can be accomplished which other frequency-sensitive devices cannot touch—making this type meter a welcome addition in any amateur shack.

Strays

That 50-cycle undertone which identified the southern California 6's has largely disappeared since the changeover to Boulder Dam 60-cycle juice in the L.A. area. Thus time works another change.

A Few More Receiving Tubes—6V6G, OZ4G, 6H5, 25L6

THE current month has seen the addition of three new tube types to the receiving list. The 6V6G, a beam power tube designed for applications where the 6L6 would be uneconomical, has been announced by Ken-Rad; Raytheon has two new types in the OZ4G rectifier and the 6H5 electron-ray tube; and a "110-volt" beam tube, the 25L6, is added to the RCA line.

The 6V6G

Built particularly with automobile radio in mind, the 6V6G is a high-efficiency tetrode of the beam type, capable of giving high output with comparatively low filament and plate currents. Characteristics and operating conditions are given below:

Heater voltage	6.3 volts
Heater current	0.45 amp.
Amplification factor	218
Plate resistance	52,500 ohms
Mutual conductance	4100 micromhos
Total plate and screen dissipation	12.5 watts

Class-A Amplifier, Single Tube

Plate voltage	250 volts
Screen voltage	250 volts
Grid voltage	12.5 volts
No-signal plate current	45 ma.
Full-signal plate current	47 ma.
No-signal screen current	4.5 ma.
Full-signal screen current	6.5 ma.
Load resistance	5000 ohms
Power output	4.25 watts
Self-biasing resistor	240 ohms

Under the operating conditions outlined above, the second-harmonic distortion is 4.5 per cent, and the third harmonic 3.5 per cent.

Push-Pull Class-AB Amplifier

Plate voltage	250	300 volts max.
Screen voltage	250	300 volts max.
Grid voltage	−15	−20 volts
No-signal plate current *	70	78 ma.
Full-signal screen current *	79	90 ma.
Full-signal screen current *	5	5 ma.
Load resistance (plate to plate)	10,000	8000 ohms
Power output	8.5	13 watts

* For two tubes.

Total harmonic distortion, 4 percent; third harmonic, 3.5 per cent. The 6V6G has the octal base with glass bulb. Pin connections are the same as for the 6L6G.

The OZ4G

The OZ4G is a full-wave gas-filled rectifier developed for use in vibrator-type "B" supplies for automobile receivers. The voltage drop is essentially constant over the usable load-current values.

(Continued on page 112)

New Tubes

(Continued from page 87)

No heater supply is required. Operating conditions are as follows:

D.C. voltage output	300 volts max.
D.C. output current	30 ma. min.
	75 ma. max.
Peak plate current	200 ma. max.
Starting voltage	300 volts peak, min.
Voltage drop (dynamic)	24 volts average

The characteristics of the tube are independent of the operating temperature. As is usual with gas-filled tubes, there is some tendency to generate r.f. noise, which can be eliminated by proper filtering and shielding.

The OZ4G has a miniature glass bulb with small octal base. Pin connections are as follows: Pins 1 and 7 no connections; Pin 8, cathode; Pin 3, anode; Pin 5, anode. Pins 2, 4 and 6 are omitted from the base.

The 6H5

The 6H5 is a third member of the indicator-tube group, the other two being the 6E5 and 6G5. The 6H5 is similar to the 6G5 except that the current to the target is controlled by a grid tied to the cathode within the tube instead of by emission saturation as in the 6G5. The addition of the grid gives an "hour-glass" effect to the pattern, since a fixed 90-degree shadow appears opposite the controlled shadow. Characteristics and operating conditions are as follows:

Heater voltage			6.3 volts
Heater current			0.3 volts
Plate supply	100	200	250 volts
Triode plate resistor	0.5	1.0	1.0 megohm
Target voltage	100	200	250 volts
Target current (app.)	1.5	3.5	4.5 ma.
Grid voltage for zero shadow angle	−8.0	−10.5	−22.0 volts
Grid voltage for 90-degree shadow angle	0	0	0 volts

The 6H5 is identical with the 6G5 in size and basing. It also has the same pin connections.

The 25L6

The 25L6 is a new all-metal beam tube for use in the output stage of a.c.-d.c. receivers, giving an output of slightly better than 2 watts with 110 volts on the plate. The efficiency and power sensitivity are high. In the operating data given below, it will be noted that slight changes in the grid bias and load resistance will produce marked changes in the character of the distortion, although the total distortion does not vary greatly. Characteristics, ratings and operating conditions are as follows:

Heater voltage				25.0 volts
Heater current				0.3 amp.
Plate voltage	110	110	110	110 volts max.
Screen voltage	110	110	110	110 volts max.
Grid voltage	−7.5	−7.5	−8	−8 volts
No-signal plate current	49	49	45	45 ma.
Max.-signal screen current	55	51	52	48 ma.
No-signal screen current	4	4	3.5	3.5 ma.
Max.-signal screen current	8	10.3	8	10.5 ma.

Plate resistance (app.).	10,000	10,000	10,000	10,000 ohms
Transconductance.....	8200	8200	8000	8000 micromhos
Load resistance.....	1500	2000	1500	2000 ohms
Distortion				
Total harmonic.....	11	10	13	11.5 per cent
Second harmonic.....	10	3.5	12	4.5 per cent
Third harmonic	4	8.5	4.5	9.5 per cent
Power output.....	2.1	2.2	2.2	2.2 watts

The 25L6 is the same physical size as the 6F6, has a 7-prong octal base with pin connections the same as for the 6L6. The tube would appear to be of interest in low-power transmitting applications for those in the d.c. districts, or for lightweight portables operating from a.c. without a power transformer. It has the high power sensitivity which is characteristic of the 6L6.

Auto-Transformer Design

(Continued from page 45)

The current in section AB is:

$$2.73 \times .33 = .90 \text{ amperes}$$

The size wire to use in each section can be determined from a wire table. The *Handbook* advises using 1500 circular mils per ampere; however, I find that 1000 c.m. per ampere will carry the current without heating.

Based on 1000 c.m. per ampere, No. 20 wire should be used in the section AB and No. 17 wire in section BC. The cost of the wire for this particular transformer would be about a dollar, and the core can be procured from a service man free,

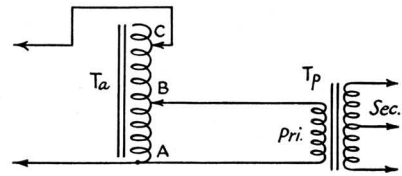


FIG. 1

or at a maximum cost of two bits. Remember that the larger the core the smaller the amount of wire needed. The amount of wire necessary for any particular job can of course be estimated from the number of turns used, size of core, number of layers, etc. If you are new at winding transformers the information in the *Handbook* is very helpful, and should be read before construction is attempted.

The transformer described here is merely used as an example to show how easily an auto transformer can be designed.

If voltages between 76 and 115 are to be taken from this transformer, taps between could be made on the winding between B and C at the proper intervals to get the desired potentials, provided the wire in this section is made larger to carry the increased current flowing between the tap and end C.

The auto transformer has many uses and, at the low cost necessary to build one, should be of considerable value to any amateur station.