



FIG. 27.25

Coupling is usually set to the desired amount.

Tertiary inductance

The number of turns on the tertiary winding is adjusted so that the required ratio of tertiary voltage to half secondary voltage is obtained (see under Coupling).

Reducing unbalanced A-M component

There will always be some residual amplitude modulation in the detector output because of the variation in the effective diode input capacitance during the A-M cycle, and because of the unbalance introduced by the transformer and other circuit components. Several methods are useful in overcoming this effect. One is to vary the effective centre-tap on the secondary winding (this method is shown in Fig. 27.26) and another is to make the resistors R_3 and R_4 shown in Fig. 27.25 unequal. In addition a resistor R_5 is used in series with the tertiary winding (see Fig. 27.25) to modify the peak diode currents, which has the effect of appreciably reducing the unbalanced A-M component particularly at high input voltages. The methods using resistors to reduce unbalance also reduce the detector sensitivity.

The reduction of unbalance effects is carried out by observing the condition for minimum A-M output when a signal which is simultaneously amplitude and frequency modulated is applied to the detector.

Time constant of stabilizing voltage

The discharge time constant of the stabilizing capacitance and the load resistance should be about 0.2 second. Larger time constants will give better amplitude rejection when the undesired modulating frequency is low, but have undesirable effects on the tuning. The tuning effect is similar to that given by an ordinary A-M receiver when the a.v.c. time constant is too long.

Experiments with the time constant of this circuit give some interesting effects. If the stabilizing capacitance is made very large, say 100 μ F or so, and the receiver is tuned rapidly across a signal, it will be found that the point of maximum output is very easily determined, and there is no effect from the usual side responses. When the receiver is detuned the noise level rises, as the capacitor discharges, and the side responses again become evident until the receiver has been tuned once through the point of maximum output.

Additional details

It is not particularly easy to achieve a good balance with the ratio detector circuit, and usually more care is required in this respect than with the conventional phase discriminator. However, the better the balance obtained the better will be the rejection of undesired amplitude modulation.

Although the side responses are normally well down on the response at the main tuning point, with this type of circuit, considerable improvement has been noticed