As the bandspread control is tuned counter-clockwise, the bandspread dial will rotate clockwise from the triangular set mark and the frequency to which the receiver is tuned will be reduced just as though the main tuning control were tuned to a lower frequency. Rotation of the bandspread control will accomplish this frequency change at a much slower rate than can be accomplished through use of the main tuning control, thus making it possible to tune the crowded shortwave bands with ease. The bandspread dial is calibrated in megacycles over regions of principal listener interest. Proper calibration of the bandspread dial ranges requires that the main tuning pointer be located at the triangular set mark corresponding to the bandspread range in use. If it is desired to use the bandspread dial as a fine tuning device, for frequencies at which it is not calibrated, the main tuning dial should be set just above the region of interest. The bandspread dial will now function as a fine tuning control in this frequency region even though it does not carry corresponding calibration marks.

The bandspread dial is attached to the bandspread capacitor by means of the exclusive National DIAL SELECTOR mechanism which permits mechanical change of the dial ranges appearing in the bandspread dial window.

DIAL SELECTOR

The exclusive National DIAL SELECTOR knob appears immediately below the bandspread dial window. It is operated by pulling the selector knob forward and rotating the knob one-half turn until the detent engages at which point the dial selector knob will snap back in towards the panel. As the dial selector is rotated, two different groups of bandspread dials will appear in the bandspread window. One of these sets of dials is calibrated in red and provides accurate bandspread tuning calibration of the 80, 40, 20, 15, and 10 meter amateur bands. The other set of dials is calibrated in midnight blue and provides accurate bandspread tuning calibration of the 49, 31, 25, 19, 16 and 13 meter foreign broadcast bands.

As mentioned in the previous section, proper calibration of any of the bandspread tuning ranges requires that the main tuning dial be set to the proper triangular set mark. The set marks corresponding to the red amateur scales are calibrated in red on the main tuning dial and the set marks corresponding to the midnight blue foreign broadcast scales are calibrated in white on the main tuning dial. The set marks are identified for each particular bandspread scale by the numbers appearing directly above them while the particular bandspread scale is identified by the same number appearing directly to the right of the bandspread index line when the triangular bandspread set mark is set at the index line. For example, the red set mark carrying the designation 80M corresponds to the 80 meter amateur band calibrated in red on the bandspread dial. When the main tuning pointer is set to this red mark and the bandswitch is set for the corresponding band, the bandspread dial will directly read frequencies between 3.5 and 4 megacycles, the frequency range of the 80 meter amateur band.

The signal from the RF stage is coupled to a primary winding on the mixer coil. The secondary of the mixer coil is tuned by another section of the main and bandspread tuning capacitors. The bandswitch again selects the proper coil corresponding to the band in use. The signal on the secondary of the mixer coil is coupled to the high frequency converter. The high frequency oscillator is a grounded plate Hartley oscillator using the cathode, grid and screen of the high frequency converter. A third section of the main and bandspread tuning capacitors tunes the oscillator with the bandswitch again selecting the coil for the band in use.

The high frequency oscillator operates 230 kilocycles above the signal on the two lowest frequency bands and operates 2,215 kilocycles above the signal on the three highest frequency bands. The output of the converter is fed to two transformers, one at each of the above frequencies. Signals appearing across the secondary of these transformers are coupled to the second converter. A grounded plate Hartley oscillator is constructed between the cathode, grid and screen of this stage operating at a frequency of 1985 kilocycles. On the two lowest bands the bandswitch disables this oscillator and the second converter operates as a straight amplifier at 230 kilocycles. On the three highest bands, the oscillator is operating and converts the 2215 kilocycle signal to 230 kilocycles. The signal from the second converter is coupled to the combination IF amplifier — Q multiplier which provides excellent selectivity in the signal path and control of overall bandwidth by means of the selectivity control.

SELECTIVITY

The selectivity control of the NC-140 combination IF amplifier — Q multiplier provides continuously variable receiver selectivity. The degree of selectivity needed depends largely on the mode of reception and existing signal conditions. The BROAD position, which provides an IF bandwidth of 8 Kc., would normally correspond to the highest receiver fidelity. However, under conditions of extreme signal interference, it is often desirable to reduce the bandwidth of the receiver and sacrifice fidelity in favor of less interference. This may be done by rotating the SELECTIVITY control clockwise from the BROAD position. This activates the Q multiplier portion of the 1st IF amplifier. Further clockwise rotation will reduce the NC-140 bandwidth from 5 Kc. to less than 150 cycles. The narrowest bandwidth is obtained just below the point where oscillation, or "howling" occurs, which is at about 7 or 8 o'clock on the SELECTIVITY control.