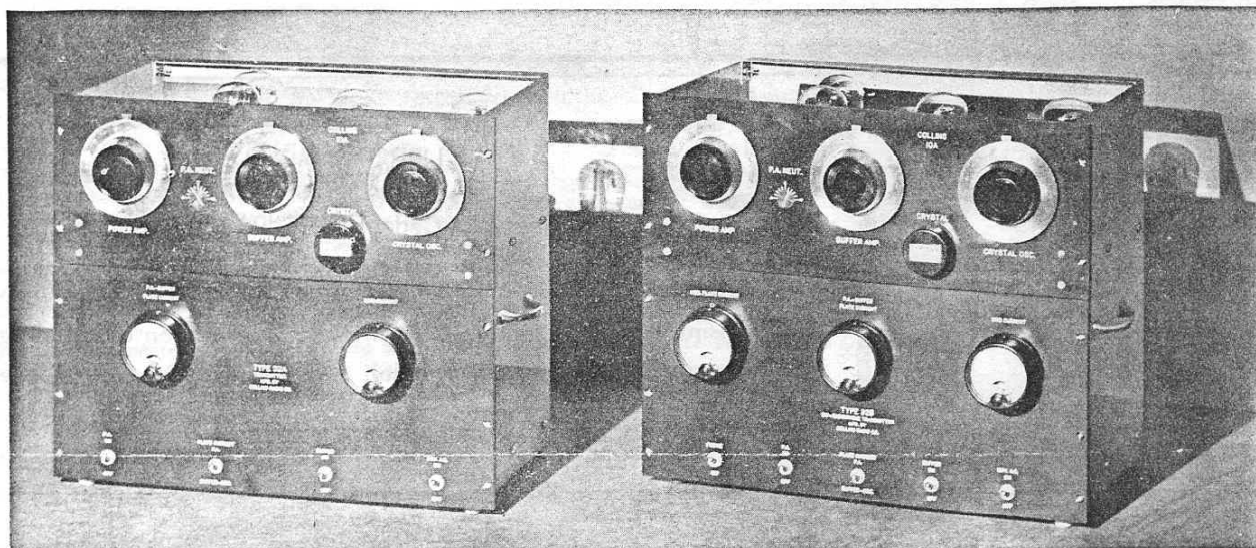


## 32A AND 32B TRANSMITTERS



One gains the impression from the radio publications of the last few months that hundreds of new tubes have been added to the already large list of tubes available to the set designer. Most of these new tubes have been designed for use in receiving sets, and there has been relatively little activity in the field of transmitting tubes. Each new tube is supposed to bring with it greater possibilities of improved performance. Out of this flood of tubes there are a few that have proven to be of considerable importance to the transmitting amateur. The type 46 tube is of particular interest. It was originally designed as a Class B amplifier and it has proven to be very useful in that capacity in low powered radiophone transmitters. Its possibilities as a radio frequency amplifier were first pointed out by George Grammer in the July, 1932, and subsequent issues of QST.\* A single 46 makes an excellent buffer stage and two 46's in parallel are capable of an output of 20 to 25 watts as a power amplifier. The 82 and 83 mercury vapor rectifiers complete the tube complement necessary to build an economical and efficient transmitter having a very unusual performance for an outfit of its size.

The new Collins 32A CW Transmitter and its radiophone companion, the 32B, have been designed to exploit fully the possibilities of these new tubes. These transmitters follow the general circuit arrangement laid down by Grammer in his QST articles, although the constructional features have been considerably modified to conform to standard Collins constructional methods. These new transmitters in appearance and in excellence of construction are very similar to other Collins transmitters, such as the 30W and the 40B. It is expected that they will find a greater field of usefulness than any previous model because of their lower cost and excellent performance.

\*QST: July, August, November, 1932; February, 1933.

If a direct comparison is attempted between the Collins 32A-B transmitters and the Grammer transmitters, several marked likenesses and dissimilarities will be apparent. The general circuit and tube arrangement is essentially the same. However, Grammer directed his design along lines well suited to the home set builder and adapted existing receiver parts to his purpose so that the cost would be as low as possible consistent with good results. His first transmitter was not crystal controlled and was intended only for 1750 kc. operation. Later designs included crystal control and provided for work on the higher frequency bands.

With Grammer's excellent work as a background, the 32A-B outfits were designed to include all the desirable features of all band operation, crystal control, etc. The mechanical construction was redesigned along standardized chassis—relay rack lines. All parts are, of course, made especially for the transmitter and are not "borrowed" from receiver practice. The result is a complete "factory job" using the best possible parts at a price but very little higher than the cost of the parts for a similar home-made outfit.

### The Tube Line-Up

In studying the circuit arrangement it probably would be best to refer first to the diagram of the 32A. A 47 crystal oscillator is followed by a 46 buffer stage. The buffer provides excitation for the parallel 46's in the power amplifier stage. In order that keying the power amplifier might not influence the frequency a separate power supply using a type 80 rectifier is provided for the 47 oscillator stage. A type 82 rectifier using a separate transformer and separate filter deliver 400 volts DC to the buffer and power amplifier stages. Keying is accomplished by opening the grid circuit of the power amplifier stage. Resistor bias is

used on all stages and, because of the high  $\mu$  of the 46 tubes, no battery bias is necessary.

The 32B Transmitter employs essentially the same circuit arrangement as that of the 32A except that two 46's in class B are used as modulators which obtain their plate voltage from the same power supply that supplies the buffer and power amplifier. In order to take care of the additional current requirements the 82 rectifier tube is replaced with an 83. The standard model of the 32B uses push-pull 45's as class A drivers for the modulators. In this way harmonic distortion is reduced to a very low percentage. When a high quality microphone is used an additional preamplifier is required. The Collins type 90C Input Amplifier is well adapted for this service. The input transformer to the grids of the 45 has a primary impedance of 500 ohms to match the output of the 90C.

When it is desired to use a single button microphone with the 32B Transmitter it is possible to eliminate the input amplifier. A single 46 tube in class A is substituted for the push-pull 45's. A microphone input transformer is substituted for the 500 ohm transformer and the additional gain obtained by the use of the single 46 driver is entirely sufficient to modulate fully the transmitter when the microphone is spoken into in a conversational tone of voice. (This is the arrangement originally suggested in QST.) —Note: On special order the 32A and 32B Transmitters can be furnished connected for the newer type 59 tubes. There is no particular advantage in their use other than the convenience of employing a general purpose tube throughout.

### All Band Operation

The 32 series transmitters can be operated on all of the popular amateur bands. This flexibility of operation is made possible by