

For Simplicity, Cheapness and Power, Build ... The "Eagle Five"

(By the Assistant Technical Editor.)



ONE of the first screen-grid valves to appear on the market some four years ago—when this type of valve made its debut—was the S625. This is a cylindrically-shaped valve with a base at each end and with a special holder for mounting. Constructors of those days will remember what an excellent valve the S625 was, and its marked superiority over the triode as a radio frequency amplifier. Even to-day, when used in a suitable circuit, this valve is almost capable of holding its own with more modern types.

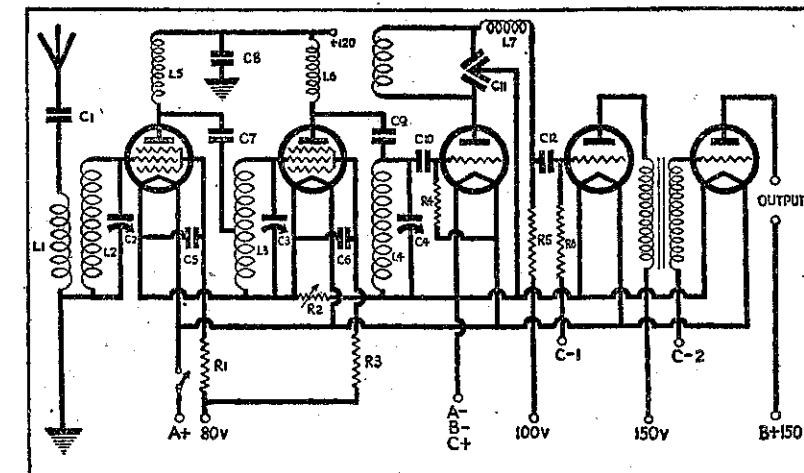
On learning that there was still quite a number of these valves obtainable in this country at a greatly reduced price, we conceived the idea of designing a powerful receiver incorporating them, and, while still giving first-rate performance, to run out as cheaply as possible. We have achieved this in the Eagle Five—a powerful and easily constructed receiver of low cost.

Briefly the set employs five valves—two stages of screen-grid r.f., detector, and a stage of resistance capacity coupled audio feeding into a transformer coupled output stage. Resistance capacity coupling has been used for two reasons. Firstly, cheapness—it eliminates an audio transformer—and, secondly, tone. Two stages of r.c.c., however, would not give enough "lift," and, what is more, would tend to accentuate the treble. Again, with two transformers, amplification on near-by stations is often excessive, with resultant overloading of the output valve, and, in addition, tone often has a tendency toward prominence of bass. Thus a combination of the two methods was finally selected.

The Circuit.

NOW for a few words about the circuit, which is really quite conventional. The two r.f. stages are auto-coupled, or, in other words, the lead from the plate of the first r.f. valve is taken through a condenser to a tapping on the next secondary—in this case, halfway down the coil.

By auto-coupling in this way the S625 is, to a certain extent, modernised, for the effect of inter-electrode capacity is



The circuit diagram. Constants will be given next week.

reduced by one-quarter of that it would have in the normal "tuned grid circuit," in which the anode of the first valve is taken to the top of the next secondary. Though a certain amount of amplification is lost with auto-coupling, yet improved stability is achieved. The loss of amplification is to a certain extent offset by the design of the coils

The first coupling condenser has a capacity of .00025 mfd., and the second .001 mfd. These values especially the second, should be strictly adhered to.

The r.f. chokes in the plate leads of the two screen-grid valves block the r.f. current and pass plate current, and in order to ensure stability should be of high quality.

The two 1mfd. fixed condensers and the two 1000 ohm resistances in the screening-grid circuits of the first two valves are included for de-coupling purposes. The specified capacity, i.e., 1mfd., of these two fixed condensers should, within limits, be adhered to, but the value of the resistances chosen is not so important. However, a very low value of resistance hardly provides a sufficiently effective barrier to r.f. current, but the choice of too high a value will do no more than lower the screen voltage by an insignificant

amount. Resistances with non-inductive windings should be chosen.

It will be noticed that the second stage of r.f., like the first, is well-screened from the remainder of the set. This is vitally necessary, for the r.f. currents have been once amplified and insufficiency of screening would be certain to cause instability. The sec-

ond r.f. stage is not auto-coupled to the detector because in that circuit conditions different from those obtaining in the r.f. stages exist.

Leaky-grid detection is employed as being the most sensitive and because it requires the least plate voltage—an important factor in a battery-operated set. Reaction is controlled by a differential reaction condenser.

As with the "Outspan Five," we debated whether to include reaction or omit it and gang all tuning condensers. Reaction won. A great majority of our constructors, we believe, desire to get the last ounce out of a receiver, and to do this they have not the slightest objection to manipulating several controls. In fact, some set-builders we have met aver that the more dials there are on a set the happier they are! Of course, reaction can be used quite successfully with ganged tuning condensers, but only if the coils are scientifically matched—a difficult task for the amateur. Even in this case, however, there is a slight loss in sensitivity.

It will be noticed from the photographs and layout diagram (to be published next week) that all de-coupling resistances, chokes, and by-

The Eagle Five

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