A NEW CIRCUIT FOR A V.F.O.

CATHODE COUPLED OSCILLATOR

By Dr. A. F. TAYLOR*, VK3AT

In my case, use is made of an EF50 in the buffer stage, with an r.f. choke of 2.5 mH. in its plate lead, and this is capacity coupled to a 6V6, also operating in class A, with a coil of 70 turns, 34 s.w.g. enamel, on a ⅝" polystyrene form, shielded by an old i.f. transformer can. The tuning coil L1 consists of 15 turns of 22 s.w.g. enamel on a ⅝" polystyrene form, with an iron dust core fixed in the axis of the coil.

The condensers coupling the tuning unit to the valves in the oscillator are 3-30 pF. air trimmers. These are just the thing as their capacity can be readily adjusted to give greatest stability.

This circuit is very stable on the 3.5 and 7 Mc. bands, but does not oscillate readily in the regions higher than 10 Mc.

the coupling between the tuned circuit and oscillator valves is very small, 2 to 5 pF. In other words variations in effective inter-electrode capacities of the valves due to variations in plate voltage and tube heating have negligible effect on the frequency determining circuit.

A voltage regulator in the v.f.o. power supply is therefore not as essential as in most other types of oscillators.

The coupling between cathode of the cathode-coupled oscillator and the grid of the following buffer amplifier is a variable 3-30 pF. air trimmer. This is used at the smallest possible value to obtain reasonable output, to further help the electrical stability of the v.f.o. Also taking the output from the cathode helps this stability. Output may be

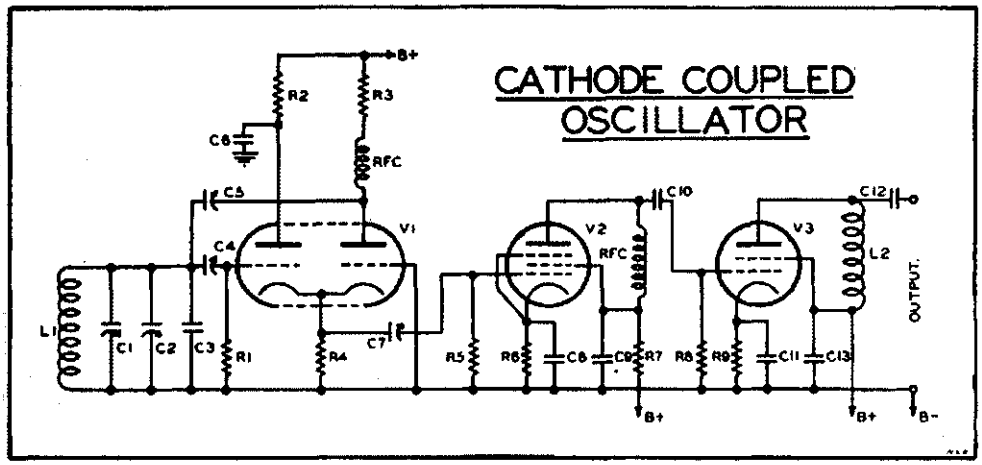

Fig. 1

C1—150 pF. variable
C2—50 pF. variable
C3—50 pF. mica
C4, C5, C7—3-30 pF. air trimmers
C6—0.1 uF. paper
C9, C13—0.01 mica
C8, C11—0.05 uF.
C10, C12—100 pF. mica
L1, L2—see text
R.F.C.—2.5 mH.
R1—100,000 ohms, 1 watt
R2, R3, R4—2,000 ohms, 1 watt
R5, R7—5,000 ohms, 1 watt
R6—150 ohms, 3 watts, wire wound
R8—330 ohms, 3 watts, wire wound
V1—6N7
V2—EF50
V3—6V6

This circuit is similar to the Franklin oscillator in some respects. It is a two terminal negative resistance type using two triodes, or a twin triode valve. One valve acts as a cathode follower amplifier and the other as a phase inverter.

The output is taken from the common cathode connection of the triodes. This circuit is not original and was shown to me first by VK3GU, who has tried it out, and it has some advantages over oscillators using single valves.

The dynamic stability is good, there is very little frequency drift during the warming up period after switching on, and variations in plate supply voltage of moderate amount do not affect the oscillator frequency. This is because

taken from the plate of the second triode where slightly more i.f. voltage is available, although it may affect the frequency more.

The v.f.o. at the writer's station operates on 4.7 Mc. feeding a two stage transmitter, the first stage being used as a tripler, and the second as a straight p.a. for operation on 14 Mc.

Results have been good from the point of view of tone and stability of the oscillator, and as with other types of oscillators, mechanical stability is essential.

The values of plate dropping resistors are not critical and may be any value between 500 to 10,000 ohms or more, and need not even be equal. The cathode resistor used is 2,000 ohms, but again is not critical.

The v.f.o. should have its own power supply and 100 to 200 volts plate supply is needed. All three stages of the unit draw a total of 35 Ma., at an operating potential of 120 volts.

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QUESTIONS & ANSWERS

Following a suggestion by VK2ALR and others recently, a Questions and Answers column makes its debut. It is intended to act as a clearing house for your queries and also your knowledge and experience, and you are herewith invited to use its services.

If you have a question of a technical nature send it in to Q. & A. "Amateur Radio," Box 2611W, G.P.O., Melbourne, and if suitable it will be published in this column. If you can answer any of the published questions you are invited to send same to the above address. All such replies will be forwarded to the questioner (if he has sent a stamped addressed envelope of suitable dimensions) and also a summary printed.

We reserve the right to reject any question as unsuitable but apart from this, this column's operation is up to YOU. So let's have your queries. To start the ball rolling, here are a couple of things we would like to know.

Q. 1—What is the velocity factor of nylex twin power flex?

Q. 2—Why are filter chokes put in the high tension lead where the windings have to be well insulated from the core when it appears that they would work equally well in the return lead at approximately earth potential?

REVIEW.

MICRO-WAVE TECHNIQUE

R.S.G.B. Publication

This little booklet is a **must** for every Amateur's bookshelf. For a general guide to micro-wave equipment from the Amateur viewpoint it has no equal, both for the u.h.f. man and even more for those who would like to know just what goes on up there.

A description is given of the operation of each of the components which are in present use; cavity resonators, wave guides, aerials and radiators, crystal mixers and detectors, and the various types of tubes; klystrons, travelling wave tubes, lighthouse triodes, magnetrons, etc. No mathematics, no formulae, but after perusing Micro-Wave Technique one has a very good idea as to which frequency these gadgets work at, their power, and their usefulness to the Amateur.

No specific circuits for Amateur transmitters or receivers are given, purposely since at present all work has to be done with equipment which is round and about. However a chapter describes the sort of set-ups which would be suitable and this should give some ideas to those who are interested.

Definitely great value for its small cost.