The "Home-Made" Three

(Constructed from the Junkbox)

(By "CATHODE")

IT is a common complaint among newcomers to the art of radio that, having spent their all in the purchase of a receiver capable of giving loudspeaker reproduction, they lack the wherewithal to properly equip it. The writer has made it a practice to recommend the purchase of the necessary accessories and the construction of a loudspeaker receiver. It is astonishing what can be done in the direction of cutting costs even where every single thing has to be bought.

In describing the construction of an "economy set" it has seemed advisable to design it in such a manner that the makeshift components employed can gradually and without difficulty be replaced by commercial apparatus as the novice's purse recovers from the inroads made upon it by valves and batteries. This gradual replacement will be found desirable, as some of the "made for nothing" apparatus is not fitted to stand up to prolonged use, and will gradually deteriorate. The resistances, in particular will become noisy in time, but will be eminently satisfactory until the purse begins putting on weight again after its operation.

The old hand doubtless recognises some of the modes of component construction as being popular among the initiated many years ago.

The intention is that the receiver in its original form will comprise three valves: a detector without reaction, followed by two audio amplifying valves. Audio transformers can obviously neither be readily made nor procured for nothing, so that our receiver must perforce be resistance-capacity coupled. Nevertheless, baseboard room adequate for the accommodation of a transformer to couple the last stage will be left, so that the final receiver will possess an r.c.c. first audio and a transformer-coupled second audio. Provision will also be made for the subsequent incorporation of reaction and a neutralised high-frequency valve; if the constructor has no intention of eventually incorporating these latter features, he will be able to shorten the baseboard appropriately.

If the purse is very thin, even before its operation, and the local station is near and reasonably powerful, it will be permissible to dispense with the third valve, thus reducing the initial expenditure quite appreciably.

A study of the circuit diagram of Figure 1 discloses the following apparatus as being necessary:—

One baseboard 17½ inches by 9 inches, equipped with strips of three-ply (or other material 3-16in. or ¼in. thick) at the extreme ends of the underside (to permit of some of the wiring being located beneath the baseboard); 1 variable condenser (see text); 3 valveholders; 1 tuning coil; 9 terminals; 2 fixed condensers of capacity somewhere between .006 mfd. and .015 mfd.; 1 fixed condenser about .0003 mfd.; 2 coupling resistances about 150,000 ohms each; 2 gridleaks about 2 megohms; 1 gridleak about 1 megohm; connecting wire (if uninsulated, sleeving will also be necessary); in addition, some small pieces of ebonite or other insulating material will be required for mounting the tuning condenser, the terminals, and the resistances and gridleaks; the construction of some of the components will involve the purchase of a number of tiny screws and nuts for assembling.

What can be Made.

TAKING these components in turn, let us differentiate between those we can economically construct and those we should buy. The baseboard will not usually involve any expenditure, although it is worth while to go to some pains to finish it nicely. A satisfactory variable condenser cannot readily be made, so that, unless the constructor happens to have one on hand, this had best be purchased; variations in the running coil can be made to accommodate any condenser which happens to be on hand, but where a purchase is contemplated a condenser having a maximum capacity of .0003 mfd. should be chosen if available.

Valve-holders can be made, but they are so very cheap that, in view of the labour involved in making them, a purchase is, in the writer's opinion, justified. Do not purchase expensive spring-mounted holders, as they are unnecessary. If one is on the constructor's hands it can be most usefully employed in supporting the detector valve. It has been assumed that valve-holders for the American-base valves will be employed, and the practical wiring diagram depicts these; the experienced constructor will be able to visualise the necessary changes in wiring to accommodate English-base valve-holders. The novice will be well advised to use the American-base holders depicted and adhere religiously to the practical diagram.

The tuning coil will in all cases be constructed not only because expense can be avoided thereby, but also because this course will result in a component of superior efficiency, as compared with the commercial article. Moreover, the task of construction will be found to be one of almost ridiculous ease.

The terminals required will have to be bought. It may be pointed out, however, that the terminals shown for battery connections can be dispensed with if a seven-wire connecting cable is used, the flex leads being brought to appropriate points on the internal wiring; it is questionable whether the economy is worth while, as a terminal strip will figure in the receiver in its final form. Small screws equipped with two nuts might, however, quite well be used as a substitute for the terminals.

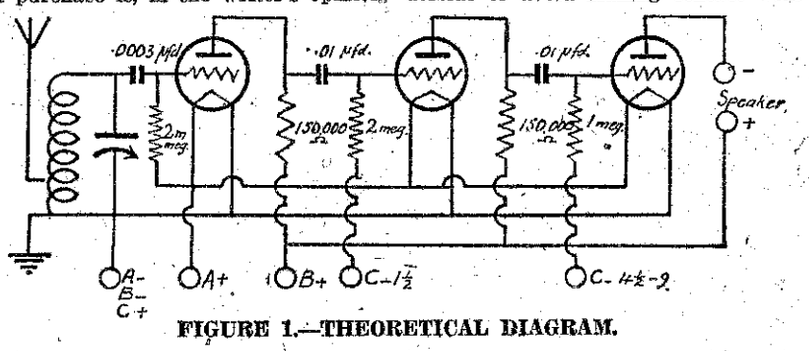

FIGURE 1.—THEORETICAL DIAGRAM.

Constructing Condensers.

THE two coupling condensers are mounted on the neat little ninepenny mounting bases, with which many constructors will be familiar. The second coupling condenser will eventually be mounted in parallel with the first and on the same base, its discarded base being then used to mount the grid condenser, which in the meantime is supported on the wiring. Soldering can be avoided, if so desired, by looping the connecting wire round tiny bolts inserted through the holes at either end of the grid condenser. The same procedure is adopted in making connection to the coupling condensers, but these do not depend on the wiring for their support.

Fixed condensers can be fairly readily made, if the constructor does not object to the work involved. The method of construction is illustrated in fig. 2, from which it should be clear that two pieces of 3-16in. ebonite are utilised as clamping pieces to hold the assembly together, the clamping screws being heavily countersunk on the underside to avoid making contact with the baseboard. Suitable sizes for the clamping pieces for the grid condenser will be: Top, 1½in. long by 1½in. wide; bottom, 2¼in. long by 1½in. wide; for the coupling condensers the widths must be increased to 1⅝in.

The grid condenser is a specimen of the simplest possible form of condenser, comprising, as it does, two conductors, each connected to a terminal point, and separated by a dielectric or insulator. For the conductors we will use copperfoil or tinfoil, and for the insulator mica, .002in. thick; mica is usually sold in thicker sheets than the thickness specified, but may be very readily split down.

Lacking the means for precise measurement, it may be assumed that when the mica is split down so thin as to be almost glass-like in its transparency, this is near enough to correct. Any sheets showing signs of faults should have the faulty pieces removed at once to avoid any possibility of these being included in the condenser. As a temporary expedient where it is intended to eventually replace the home-made condensers by commercial products, each sheet of mica may be replaced by two sheets of uncreased waxed paper, such as cigarettes are wrapped in. Each sheet of copper-foil or tinfoil is 1½ inches by ½ inch, the mica sheet separating them being 1½ inches by 1 inch and so arranged as to protect beyond the area where the two pieces of