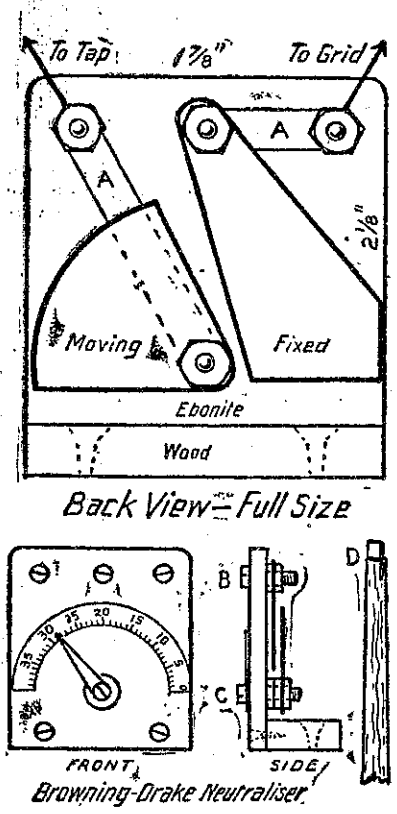
The Browning Drake Receiver---Continued

best tuning, and the process of neutralising is gone through again. The second attempt is practically certain to be correct. If neutralisation cannot be obtained, reverse the connections to the R.F. primary marked A and B, and try again. If it cannot be obtained either way, it may be an indication that the capacity of the neutraliser is too great or too small, and in either case the correct valve must be substituted.



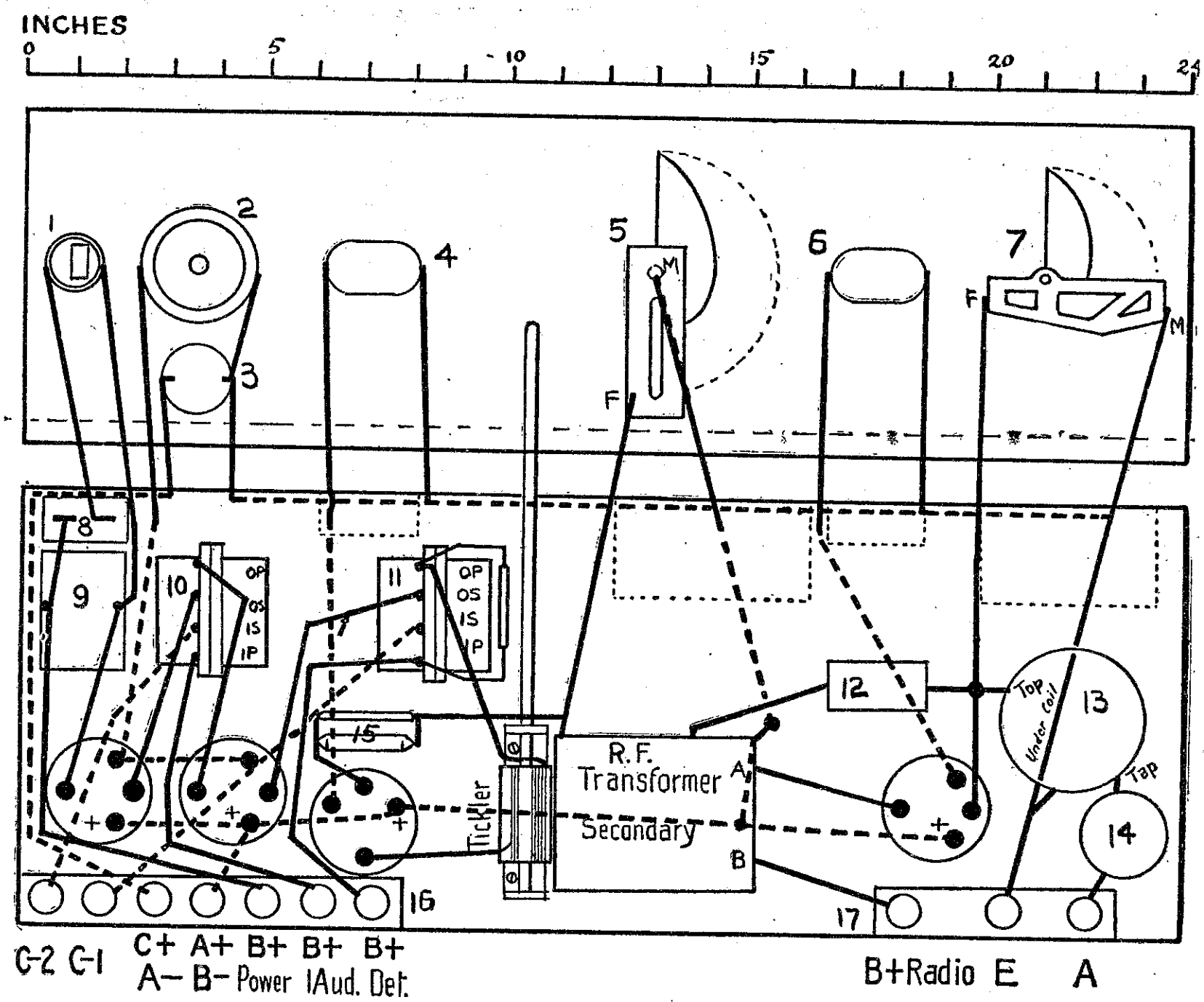
SUITABLE VALVES.

It is important that a valve of only medium impedance be used in the R.F. stage. This means an impedance of 12,000 to 16,000 ohms, the UX201A (15) having the former figure, and the PM3 (16) the latter. The figures in parentheses are the requisite number of primary turns, approximately, as a turn or two more or less may be found to give greater volume.

A useful list of valves and their characteristics was published on January 13, and every constructor should file this for reference. From this list a valve may be chosen for any purpose with a knowledge of its exact suitability. Primary turns increase as impedance increases, and it is advantageous to keep primary turns to the minimum that will give good results. The following are approximate turns to suit varying impedances: 20,000, 22; 18,000, 20; 16,000, 16; 14,000, 15; 12,000, 14; 8,000, 12.

The 201A valve has been used in all four stages of this receiver, but such an arrangement is not always the best, and would not suit dry-cell A batteries. As detector the 201A, PM3, or BM3A, the latter especially suited where a first stage of resistance coupling is included. To precede a resistance unit the PM3A (4 volts), or Philips A22[illegible], A425, or A360 valves are suitable, requiring 2, 4, and 6 volts on the filament respectively.

The matter of audio valves was treated last week in a two-valve amplifier article, and perusal of this will prove useful to intending constructors.



WIRING DIAGRAM OF THE FOUR-VALVE BROWNING-DRAKE.
(1) Single-circuit output jack. (2) Audio rheostat. (3) Switch cutting out all filaments. (4) Detector rheostat. (5) Secondary condenser (M, moving; F, fixed). (6) R.F. rheostat. (7) Aerial tuning condenser. (8) Filter condenser. (9) Choke coil. (10) Ferranti transformer (AF3). (11) First audio transformer or resistance unit. (12) Neutralising condenser. (13) Aerial coil. (14) Aerial series condenser. (15) Grid leak and condenser. (16, 17) Terminal strips. The panel is shown slightly detached from the base. All dotted connections run under the baseboard.

THE "RECORD" B BATTERY ELIMINATOR

LETTER FROM A SATISFIED CONSTRUCTOR

A Christchurch reader set out to construct the B eliminator a while ago, and up to completing the transformer was successful, when a hitch occurred, the symptoms were explained to the writer, and a "short" was suspected, as subsequently turned out to be the cause of the trouble. Here is the constructor's letter.

"I have got the eliminator going at last, and the results are splendid, quite equal to the accumulator high-tension battery I have. On two occasions have had continuous runs of approximately six hours, and the transformer was as cool at the end of the run as at the start. The trouble with the transformer was caused by one of the "stampings" cutting through the insulation when pushing in the last few to get them as tight as possible, thus 'shorting' the filament winding. Needless to say, this did not occur the second time. Again thanking you for your kind help, and congratulating you on designing such an efficient instrument.

"Megohm" congratulates this constructor on his perseverance in face of bad luck. The construction of an eliminator is no small affair, and calls for care and patience from start to finish. But for the amount of trouble it will save when working, it is well worth while. Careful construction will bring its reward, and no "sling-together" methods should be attempted.

The care required in putting in the last few laminations was mentioned in the instructions, and a recommendation was given to slope off the lower corners of the last few T's. It would be a wise additional precaution if constructors would, as soon as the laminations begin to get tight, narrow the long leg of the T's by an eighth of an inch on each side to prevent any chance of cutting the manilla, which should be double thickness. It is important that the packing should be tight, as any looseness tends to produce mechanical hum. Another point is to put each of the last few laminations in under the outside one, so that friction on both sides is taken by metal instead of by the manilla. If it is found that a short piece of tin can be pushed in at either end to tighten the pile, this should be done. All sharp edges should be carefully rounded off the last few laminations—it pays.

This constructor was unable to procure a Raytheon tube, and is for the time being using two P.M. 4's as rectifiers. With these valves the total current consumption of the eliminator is about six watts. With a BH Raytheon tube the consumption increases to about ten watts, owing possibly to a small amount of current being by-passed between the electrodes in the tube.

It is quite an easy matter to check the amount of current consumed by reading the household electricity meter during the daytime when no other current is being drawn. The "hundreds" dial only need be watched. Each division on this dial equals ten watts. Take the consumption of the eliminator for one hour, and if it is efficiently constructed it should not show much more than one division (10 watts) on the dial in question. If only a little over half a division is indicated in one hour, the highest efficiency has been secured.

A thousand watts for one hour is one unit of electricity, for which the average price is sixpence. One unit will therefore provide ten watts for one hundred hours, and six watts for 166 hours.

Quite a number of readers are wisely "taking their time" in building the eliminator, and the constructor in question is the first to report the finish of his task.

WIRING UNDER BASEBOARD.

In the issue of October 28 a diagram was given of the wiring under baseboard, with figures for reference. As the instructions progressed, there appeared to be sufficient data to guide constructors without referring to these numbers. A correspondent has just written asking for references to these figures, and as it took some time to trace out the numerous connections, they are given here as an additional guide to constructors.

1 to one side of all fixed condensers, and joins to 2.
2 to H.T. negative terminal on left of panel.
3 to H.F. resistance: Other end to condenser 5.
4 to detector resistances: Other end to condenser 4.
5 to L.F. resistance: Other end to condenser 3.
6 to three resistance arms: Other end to condensers 1 and 2.
7 to condensers 6, 7, 8.
8, 9, to rheostat.
10 to H.T. 1 on transformer (fuse).
11 to H.T. centre tap.
12 to H.T. 2 on transformer (fuse).
13, 14, to choke coil.
15 to filament centre tap.
16 to plate terminal valve socket.
17 to transformer panel (marked "rheo.").
18 to Fil. 1 on transformer panel.
19 to Fil 2 on transformer panel.
20, 21, to same filament terminal of each socket.
22, 24, to other do.
23 to plate terminal valve socket.
S to tin case. Tin partition and condenser holders should be connected to the case by a soldered wire.

SUPER-POWER VALVES.

When running a super-power valve in the last audio stage, an extra fuse and terminal can be provided below the rheostat, and through this the full high-tension may be applied to the plate of the last value, a 2 mgd. condenser being placed across this output in the eliminator. This method gives increased plate voltage for the last valve, and also reduces the work for the L.F. resistance.

A reminder is given that when the filament output is no longer required for rectifier filament heating, it may be quite successfully used to heat the filament of the last power-valve, provided that it has a robust filament to retain the heat between cycles. The P.M. 254 or 256 type work well on this system, but leads from the eliminator to the set must be twisted together to neutralise the a.c. hum, which might otherwise be picked up by the set. Alterations required for power-valve filament heating are described in the article.

The eliminator construction articles appeared in seven issues of the "Record," commencing October 14 and ending November 25, 1927.

A correspondent points out that the gravity type of Daniel cell will work quite well with a 1 to 80 solution of sulphuric acid and water.

A correspondent asks for advice regarding the use of a kite to hold a vertical aerial. This is an early and primitive method of getting a wire skywards. Marconi used small balloons for the purpose in early attempts. Under modern conditions a kite aerial cannot be more than an experiment, and would be just about as unreliable as possible, and the best advice is to leave it alone and put the money into a pair of good high poles.

A Christchurch correspondent inquires about the possibility of an amateur constructing a bar amplifier. Depends upon the constructor's capabilities—failing considerable experience in construction, this is best left alone.

It is estimated that upon a basis of five persons to each receiver, 90 million people at present listen-in. This represents 9 per cent. of the total population in zones which to-day enjoy a reliable broadcasting service.

"Megohm" does not claim "perfect" reception for the amplifier recently described, although that word inadvertently appeared in the heading. However, the set is one that will give highly-satisfactory results if proper care is taken in construction.

"Fuzzled" (Ohaknne), (no name).—Call at P.O. for letter.

The latest type of Brandes variable condenser impresses one as a well-constructed piece of apparatus, precision, and finish being at once apparent. A four-inch bakelite dial carries the scale, and the central knob actuates a 60 to 1 vernier with milled friction drive, giving perfectly smooth action free from any suspicion of backlash. A shipment of these in two values, .0005 and .0003, has just been landed by the International Radio Co., Ltd., Wellington.