

the hole in the cone. Slide on one of the small copper cones, push the pot magnet into place, then put on the remaining small copper cone on the end of the bolt inside the paper cone. Finally add a  $\frac{1}{16}$  in. washer and bolt up tightly. The speaker is now complete, and when trying out don't do as the writer did, and get the two sets of terminals at the back mixed up.

The great point to note throughout the whole of the construction is to make everything absolutely firm. All joints fastened by secotine must be hard and tight. It is not a job that can be completed in a night, and if a list of components was given, the writer would head the bill with "patience." One hint to anyone who may feel competent enough to do it: the gap in this speaker has been made fairly large, and if any reader cares to go to more trouble in the construction of the moving coil, the size of the gap can be reduced to 5-64 inch, with a far greater increase of sensitivity. The smaller the gap, other things being equal, the greater the volume obtainable with a given input.

**A Reminder.**—This speaker has a low resistance winding and a 25-1 transformer will have to be used between the speaker and receiver or amplifier. This could quite easily be arranged on the baseboard alongside the pot magnet.

### The Wave Trap

**THE** theory of a wave-trap is as follows:—A broadcasting station sends out two waves, i.e., an ether wave and a ground wave, in the same manner that an electric cable carries negative and positive current. The wave-trap resembles the first part of an ordinary receiver. The aerial carries the movements of current down through the primary coil, and, instead of being picked up by induction in the secondary coil, these movements in current (termed radio-frequency oscillations), are earthed. As the other wave from the station is also a ground wave, we might roughly say that the undesired station has been "shorted," thus allowing us to tune in another station without interference.

### The Screen-Grid Browning Drake

**RE** letter in "Radio Record" about screen-grid valve and primary coil in Browning Drake 4, I have had success as follows and hope it might help someone else, writes a correspondent.

I screened R.F. stage and took out neutralizing condenser. I have 3in. secondary of 60 turns and I made a 45-turn even-wound primary about 2 7-8in., so that it just slipped inside secondary. This made the set howl too much, so I made a 23in. primary same as above and from that time I have had good results. A primary coil with more

turns (say 60) might be better, but I have not tried it.

My aerial is set more for the Australians than the Americans, but I have three of them using 90 volts B battery. I am not a D.X. chaser, I just logged these from curiosity. WENR, Chicago, has been heard between 40 and 50 yards away from the door.

I have wired another set like this besides my own and the owner has gone "D.X. mad" since, so I cannot complain.

[In view of the interest created in the screen-grid Browning Drake, it will be fully described in the next edition of the "Listener's Guide," now in preparation. While this is in preparation we would like to hear the views of any correspondents who have made up the screen-grid model.—Technical Ed.]

## Useful Tips and Jottings

### A Light Within.

**WE** grope within our cabinets when changing valves, when altering coils, or when making those necessary and critical adjustments often called for—grope within cabinets which are non-illuminated. Valves are inserted or tried the wrong way round. Filaments burn out. Coils are terrible devices to plug into socket holders which cannot be seen.

And all this inconvenience can be obviated by lighting up the inside of the set with a 3-volt lamp which costs 6d., fitted to a holder which costs the same, and supplied with current from a battery worth 4d. The only other ingredient required is a switch which costs 3d., or which can be made with two old terminals and a hooked piece of wire.

As this lamp is required on comparatively rare occasions, the battery lasts a long time. Only those who have thus equipped their sets know the value of an addition which, at least, saves many a bad temper and unparliamentary expressions.

### A.C. Hum.

**A**.C. hum frequently occurs in a receiver, even though the receiver itself is not connected to any accessories using A.C. power. This hum is often picked up by a lamp or conductor in the immediate vicinity of the receiver. Quite a common practice is to place a lamp on top of the set to illuminate the tuning controls. Naturally the lamp, and the lamp cord supplying the A.C. power to it, are in close proximity to the instruments in the set, which, due to their sensitive nature, pick up any interference generated in the field around the conductors. It is best to investigate all lighting fixtures in the vicinity of the set in attempting to eliminate the hum.

### Tinning the Soldering Iron.

The professional set builder finds that he spends a considerable amount of time keeping the soldering iron well tinned. This can be overcome by keeping the tip of the iron partly submerged in solder in the following manner. Procure a block of wood about 10in. long, 4in. wide, and  $\frac{1}{2}$ in. thick, upon which mount a heavy piece of transite board. To one end of the block fasten a can cover such as may be procured from a baking powder can. Then at the other end of the block

of wood a stand is mounted which may be constructed from a piece of heavy wire. Melt considerable solder in the can cover and place the tip of the iron in it. This keeps the iron from coming in contact with the air, and consequently keeps it free from oxide.

### Preventing Turning.

**A**NOTHER way of ensuring that terminals do not turn in the panel when the receiver is finished is to fit them with locking pins.

To fit the pin, put the terminal upside down in the vice. A block of wood underneath will help to support it and to prevent it from tilting sideways. In the underside of the head drill a hole with a fine drill, midway between the shank and the edge of the head. In the hole put a piece of hard brass wire. This should be a tight fit in the hole, projecting about 1-8in.

To mount, drill the usual clearance hole in the panel for the shank, put the terminal in, and give it a light tap with a mallet, so that the pin makes a mark on the panel. Centre-punch this mark, and drill a hole with the same drill as before. When you put in the terminal, tap it home with the mallet, and secure with the usual nut.

### Calculating Accumulator Capacities.

**THE** actual capacity of an accumulator can quickly be calculated if the size and number of plates are known. If the case is celluloid the procedure is simple. The number of positive plates is counted. These can easily be distinguished by their brown colour, compared with the blue grey of the negative plates. The length and width of each plate is then measured in inches.

Calculate the capacity according to the formulae as follows:—

C equals  $N \times L \times W \times K$ .

Where N equals number of plates.

L equals length of plates in inches.

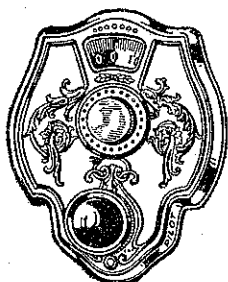
W equals width of plates in inches.

K equals a constant (with commercially made plates this is .77).

C equals capacity of accumulator in amps.

When charging an accumulator the charging rate should not exceed one-tenth of the actual ampere-hour capacity as determined above.

## 1929 Pilot Radio Products



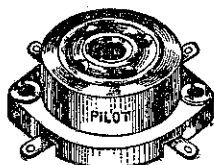
### PILOT DIALS.

	£	s.	d.
Kilograd Dial, 10-1 Vernier .....	0	6	6
Vernier Art Dial, Black .....	0	6	6
Vernier Art Dial, Mahogany .....	0	7	0
Vernier Illuminated Dial with Bulb ..	0	1	6
Double Illum. Drum Control Dial ..	1	12	6
Single Illum. Drum Control Dial ..	0	18	6



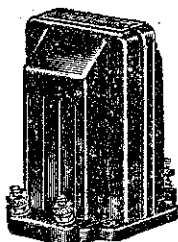
### LEAKS.

Pilot Gridleaks, all Capacities ..	0	1	6
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### SOCKETS.

UX Unassembled Socket .....	0	1	3
UX Cushioned Socket .....	0	2	9
UX for AC Tubes UX 227 Type ..	0	2	9
Universal Fitall UX Socket .....	0	2	3



### TRANSFORMING.

Audio Transformer, $3\frac{1}{2}$ to 1 .....	0	18	6
Audio Transformer, 2 to 1 .....	0	18	6
Output Transformer, 1 to 1 .....	0	18	6

### CONDENSERS, CENTRELINE VARIABLE

.00016 MFD 8-plate Condenser ..	0	9	6
.00025 MFD 13-plate Condenser ..	0	11	0
.00035 MFD 17-plate Condenser ..	0	11	0
.0005 MFD 23-plate Condenser ..	0	12	0
Condenser Couplings .....	0	2	6

### CONDENSERS—FIXED.

.0001 Fixed Condenser .....	0	2	0
.00025 Fixed Condenser .....	0	2	0
.0005 Fixed Condenser .....	0	2	0
.001 Fixed Condenser .....	0	2	3
.002 Fixed Condenser .....	0	2	3

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