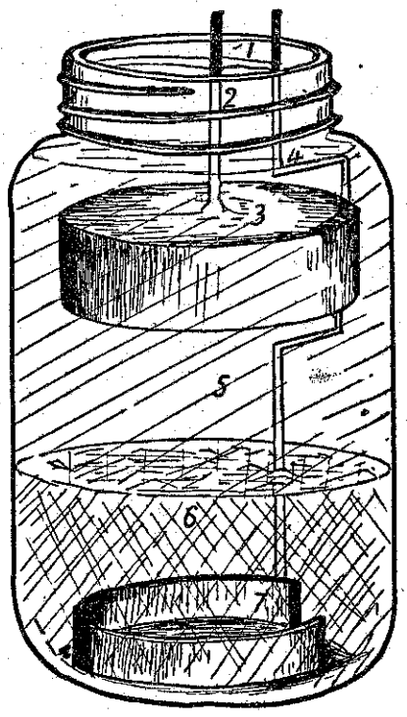
copper left and these will be the negative and positive of the charger. Connect these to the terminals of the accumulator. Do not worry because the voltage of the charger is higher than the voltage of your valves, because if an accumulator is between the two there will be no damage to either.

If, however, they are running a set of valves direct, the voltage must be the same.

At an "A" battery the Daniel Cell will supply at least half an amp, so will be quite suitable for 4 or 5 valves sets using low filament consumption valves. If your set uses .06 valves of the 221 or "A" type the charger will do quite well as an "A" battery.

As we mentioned previously, the battery will need an amount of attention. Copper sulphate must be added every fortnight, and the zincs will probably wear through in about six months.



GRAVITY TYPE DANIEL CELL.

A useful expedient where regular Daniel cells cannot be used.

(1) Wooden plug, ½in. diam.; (2) brass rod, about 1-8in. diam.; (3) zinc plate, ¾in. thick; (4) copper wire; (5) distilled water; (6) bluestone; (7) copper plate, 6in. x ½in. x 1-16in. The water should cover the zinc plate.

Apart from this, the battery should give excellent service.

If anyone is in difficulty with this charger or requires further information they may obtain it by writing the Technical Editor.

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Audio Choke Construction

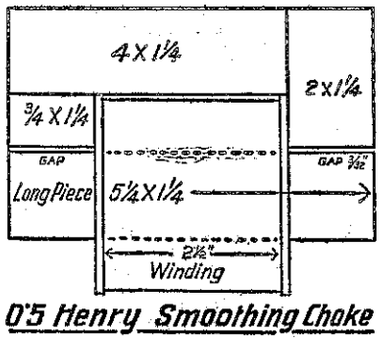
Detailed Account for Amateurs

IN response to applications from many correspondents, we are republishing a section of the 1930 "Listener's Guide," dealing with choke construction. We regret that so many of our readers have been unable to obtain copies, and are doing our best to meet the situation by reprinting the most wanted sections in the "Record."

Assembly of chokes differs from that for a transformer on account of the "gaps," which are breaks in the continuity of the core introduced to prevent the core becoming magnetically "saturated," as even before saturation point is reached the inductance lowers considerably. On account of this it will be seen that a choke holds only its nominal inductance so long as the specified mills carried is not exceeded. Saturation is avoided when increased mills. are carried, by increasing the width of the gaps, but this also lowers the inductance, therefore it must be recognised that the carrying capacity of a choke is fairly limited if the nominal inductance is to be maintained, that heavy carrying capacity can only be obtained by the employment of a massive core and ample gaps—sometimes up to ¼in.

The pieces of stalloy that pass through the centre of the winding are cut to project the width of the stalloy at each end. These are packed in tightly, after which the remainder of the core is assembled. Squares of cardboard of suitable thickness to form the gaps are stuck to the sides of the projecting central core, and the short pieces of stalloy assembled against these. Clamps, which may be of wood, are provided at each end and bolted together. Four sizes of stalloy are used in building a choke core, one heap the thickness of the core for each size.. That is, for a 1¼in. core, each pile would be 1¼in. high.

Enamel is the only practical insulation for wire to be used in small chokes, because the inductance depends



0·5 Henry Smoothing Choke

largely upon the number of turns that can be put into given space, or, in other words, upon how near to the core the turns may all be placed.

Inductance varies as the square of the turns, and proportionately to the cross-section of the core. If the number of turns is halved, the inductance drops to one-quarter the value, but if the cross-section of the core is halved the inductance will be halved. It is thus seen that an alteration in the number of turns has a much greater effect than an alteration in core cross-section. Causing the turns to occupy too great a space is equivalent to reducing their number, as the distance from the core renders them less effective. This unnecessary spacing may be caused either by using too heavy gauge of wire, or by using wire with bulky insulation. In gauges of wire smaller than 26 s.w.g. double cotton covering occupies more space than the conductor, and of 26 only half the number of turns of d.c.c. can be put in the space occupied by a given number of turns of enamelled. Coming down to 36 gauge, it is found that d.c.c. occupies over 4 times as much space as enamel, therefore d.c.c. wire cannot be used for small chokes if high inductance is required, without unduly increasing bulk and direct-current resistance on account of the excessive number of turns required.

The foregoing also shows that in order to keep the inductance high, the gauge of wire should be no larger than will safely carry the current to be passed.

Chokes to carry not more than 10 milliamperes are sometimes made without gap, giving a very high inductance. This type can be utilised for impedance or choke coupling in audio amplifiers.

The ends of the winding are usually brought out to two terminals in a strip of ebonite, which is attached to the wooden clamps in a suitable position.

A table is given of particulars of core and number of turns of wire for small audio?frequency chokes for eliminators, choke coupling, suppression of "motor-boating," etc. Dimensions are also given of a core suitable for chokes wound with wire not heavier than 34. The smaller dimension of the window may be altered to suit the requisite turns. A further table shows approximately how many turns of a given gauge of wire may be put into a "window" of given size, whilst the following tables enables the approximate resistance to be found by multiplying the figure there given by the number of thousand turns to be used. whilst at the right-hand of the same table the weight of wire per thousand turns is given. Thus the weight to be purchased for a given size may easily be calculated, although a small amount in excess should always be allowed, also bearing in mind that not less than ¼lb. can be purchased.

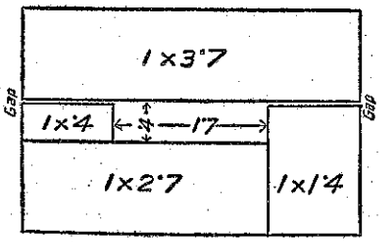
If a choke is constructed to give a certain inductance when the maximum specified current is passing, then the more current is reduced, the higher will the inductance value rise.

Chokes for "A" Eliminators.

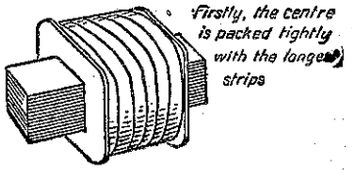
A GOOD low inductance choke is essential to an "A" eliminator, and the one here outlined will be found to answer the purpose well. Details of choke construction will be found in

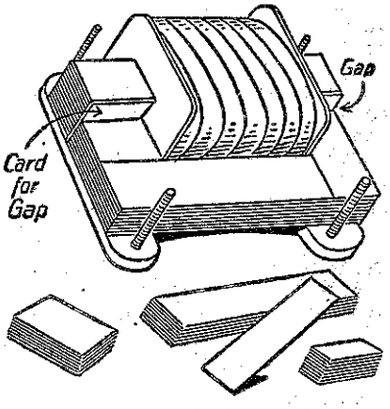
(Concluded on page 29.)

Choke Construction



Core Dimensions for Small Chokes





Then the remainder of the Core is assembled

Audio Choke Specifications

Henrys	Core 1×1				Core 1¼×1¼			
	Turns	Gap	Mills	Wire s.w.g.	Turns	Gap	Mills	Wire s.w.g.
20	6250	·05	90	32	4800	·05	120	30
	4700	·03	70	34	3750	·03	90	32
30	7400	·05	75	34	5800	·05	100	32
	5700	·03	50	36	4500	·03	70	34
50	9500	·05	60	34	7500	·05	75	34
	7300	·03	45	36	5900	·03	50	36

Thinner wire may be used if maximum current not passed

Width of Window	Length of Window 2¼"	1·7in			
	32's	34's	36's	38's	40's
·3in	Turns 3000	3000	5000	6000	7500
·4	4000	4200	6000	8200	11500
·5	5000	5200	7500	10,000	15,000

Resistance per 1000 turns of Wire—4" Window			*Approx. Weight of Wire per 1000 turns*	
Core 1×1	Core 1¼×1¼	Gauge of Wire s.w.g.	Core 1×1	Core 1¼×1¼
43 ohms	51 ohms	32	2·8 ozs.	3·3 ozs
58	70	34	2·0	2·4
85	102	36	1·34	1·62
156	165	38	0·85	1·2
213	260	40	0·543	0·653

Multiply above figures to ascertain Total