

# The Philips 372B *Super Inductance* By R.J.Grant

A battery set as suggested by the 'B' in the model number, from the Philips "Super inductance" range. I purchased this set from a boot fair, when the back was removed it was found to still have both of its batteries, a Drydex combination HT with grid Bias battery, and a glass accumulator. Unfortunately on discovering the batteries inside I failed to hide my enthusiasm, this didn't leave much manoeuvring room when it came to reducing the price. The battery is a real bonus as the batteries in these sets are often missing and an original to restore or as a pattern to reproduce for another set which really makes it a double-find.



The cabinet had all of its lacquer removed and had been rubbed down ready to be refinished, it looked like this had been done some time ago as it was now a bit grimy with a few digs and bits of veneer missing. All of the knobs were intact and in good condition, the back had a few minor signs of past dampness in the form of white chalky marks but was otherwise ok.

First released in 1934, this set seems to be only part Art Deco in style as it has a nice inlaid veneer of different woods around the speaker fret and across the front and around the sides of the cabinet, but an earlier conventional keyhole style tuning scale. Although this is nicely calibrated in metres, there's no room for station names, generally the set's still in keeping with a nice piece of furniture.

Electrically, this is one of the Philips 'Super inductance' range employing six valves with a push-pull class B output stage (PM2B Output valve) with the good quality cabinet, making it one of the top class sets of its day.

A 'Super inductance' set is instantly recognisable by the three shiny copper coloured coil screening cans. These are multiple Tuned Radio Frequency stages

(TRF) which Philips seemed to hang on to longer than the other manufacturers but soon out-performed by Superhetrodynes already around at this time.

The knobs were removed easily as I had pre-treated the grub screws with a drop of WD40 several days earlier, careful not to get any on the bare veneer. The chassis sits on a middle shelf inside the cabinet with the accumulator next to it and the HT and Grid bias battery in the compartment below.

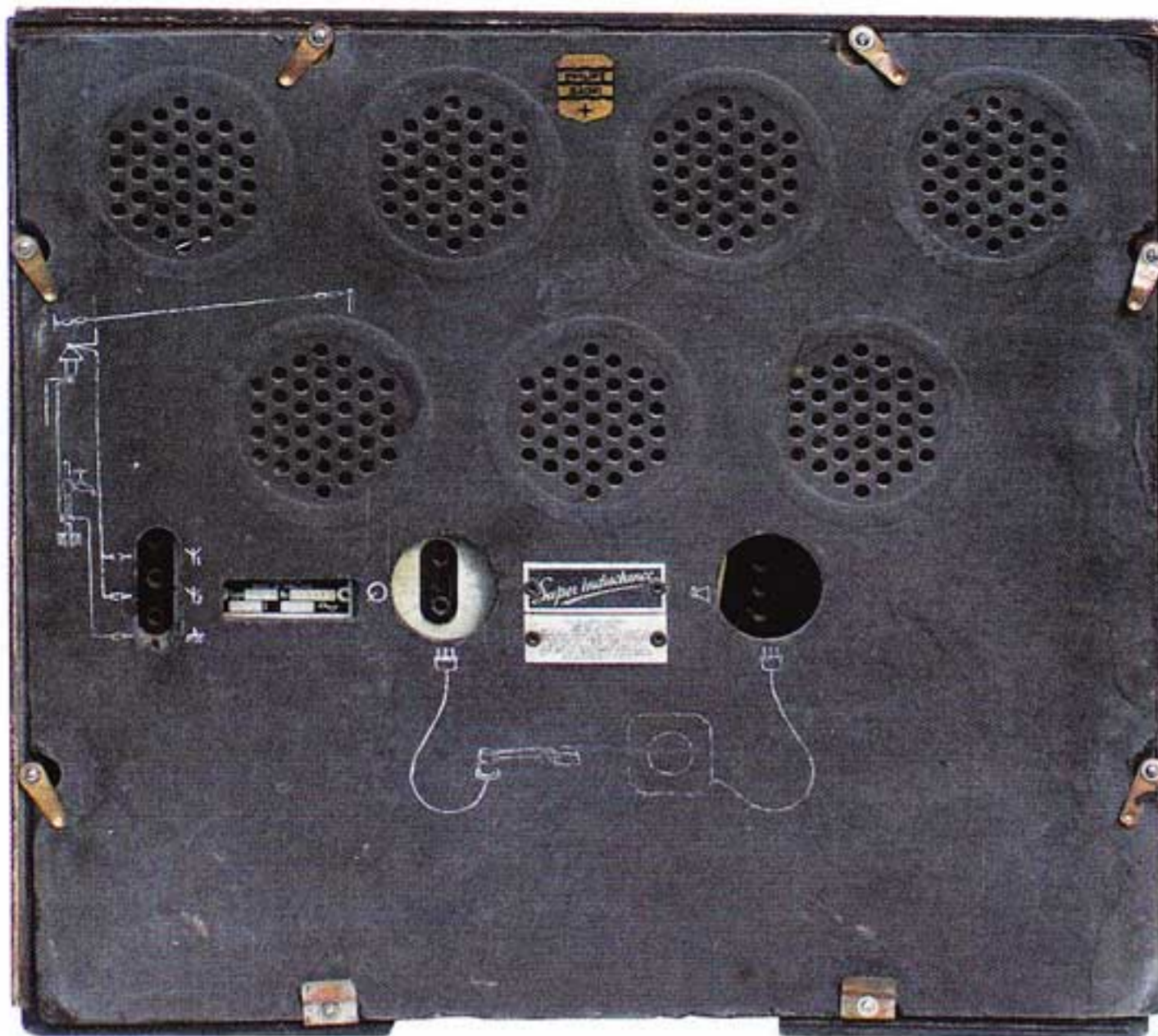
The four chassis retaining screws were removed. These are accessed through holes in the bottom of the cabinet and the speaker disconnected via two ceramic terminal blocks, definitely not original but about the right age.

The chassis now removed was a bit grimy and showing its age but has very little evidence of corrosion and will only need electrically repairing and cleaning. The four speaker clamp brackets were removed, the nuts were locked with extra lock nuts and then sealed with the famous red paint typical of Philips who continued this practice well into the 1960's. The speaker was removed complete with its cotton dust protection bag and output transformer.

The speaker cloth was next to be removed and peeled off quite easily, the glue had turned into dust and really lost its grip. The cloth was in excellent condition and would only require vacuum cleaning; this set had obviously come from a non smoking household.

The tuning scale escutcheon was removed next and in order to clean and polish it properly I removed the celluloid window. This was held in place by four brass rivets. These Bakelite rivets have a coarse helical thread, carefully cutting slots in them with a hacksaw blade enables them to be unscrewed and re-used with minimal chance of damaging the Bakelite, these rivet slots are hidden from view when the chassis is re-installed.

The brass and enamel Philips badge is frequently missing on these sets, so when the set has one I usually remove it and re-glue it with modern glue so as not to lose it in the future. If it doesn't come out easily then I drill a small hole in the Bakelite behind it and push it out with a piece of stiff wire, well worth doing as you can polish it with Brasso and spray it with clear lacquer before refitting. The brass on these badges is usually oxidised



The back showing aerial details



The speaker re-installed



The labelled battery leads



Back off, batteries installed

and appears to be unprotected, either from new or the lacquer lost with age. On this set the badge was stuck fast (the first time I have come across this!) so after polishing it with the escutcheon, I carefully lacquered it with a brush in situ.

The knobs were cleaned and polished at the same time and the indent in the wave change switch re-filled with a touch of gold coloured paint. This indent points to one of four brass markers on the front of the set, Off, MW, LW, Gram, these will have to be removed before the re-finish of the cabinet, they stand quite proud of the woodwork and a tug with a pair of pliers pulled them free quite easily. These were also polished with Brasso, then pushed into a piece of card to keep them vertical while being splayed with Lacquer ready to refit.

The cabinet was cleaned with foam cleaner and then wiped over with white spirit, I noticed that in one place the previous restorer had sanded through the veneer, there were several digs and small pieces of veneer missing, all of this can be disguised with filler and stain, but there's a large chunk right in the middle at the top which had to be dealt with as it's a real eyesore and difficult to hide. I cut a piece

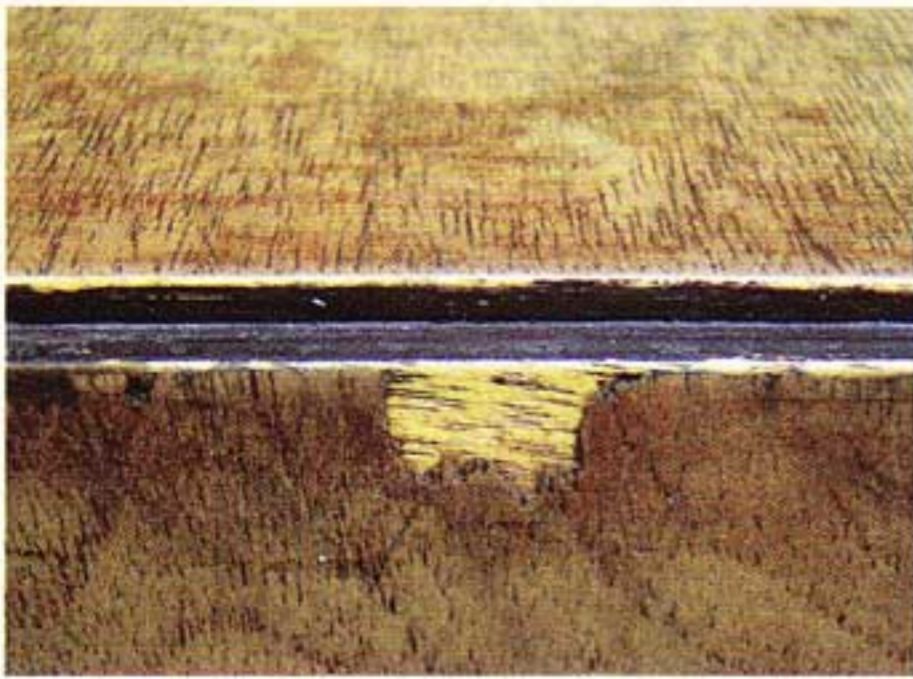
of veneer of as close a colour and grain match as I could find, (salvaged from a wrecked set) slightly larger than the chunk missing, I then placed this over the gap and accurately cut the original veneer round it with a scalpel. I then trimmed the hole out to the cuts so the new piece would fit exactly, this was glued in place with PVA glue and held with masking tape while the glue dried. The new veneer was slightly thicker than the original so it can be cut back flush with 900 grade cutting paper (Halfords).

The rest of the digs and missing veneer were small and filled with wood filler of similar colour and then cut back with fine cutting paper ready for the new finish, the new piece of veneer and small areas where the previous sanding had gone through the veneer were colour matched with wood stain.

At this stage the flaking dark brown paint used on the non veneered ends of the plywood between the front and top of the set, were sanded smooth ready for a new coat of paint. The visible end of the plywood in the speaker fret was also painted brown, this required a little more attention as the layers of the ply were uneven, probably due to exposure to dampness sometime during

its long life. The really proud bits were cut back level with course sand paper, then all exposed end grain plywood sanded smooth and primed with diluted Unibond (PVA Glue 50/50 with water) ready for re-painting after refinishing the rest of the cabinet.

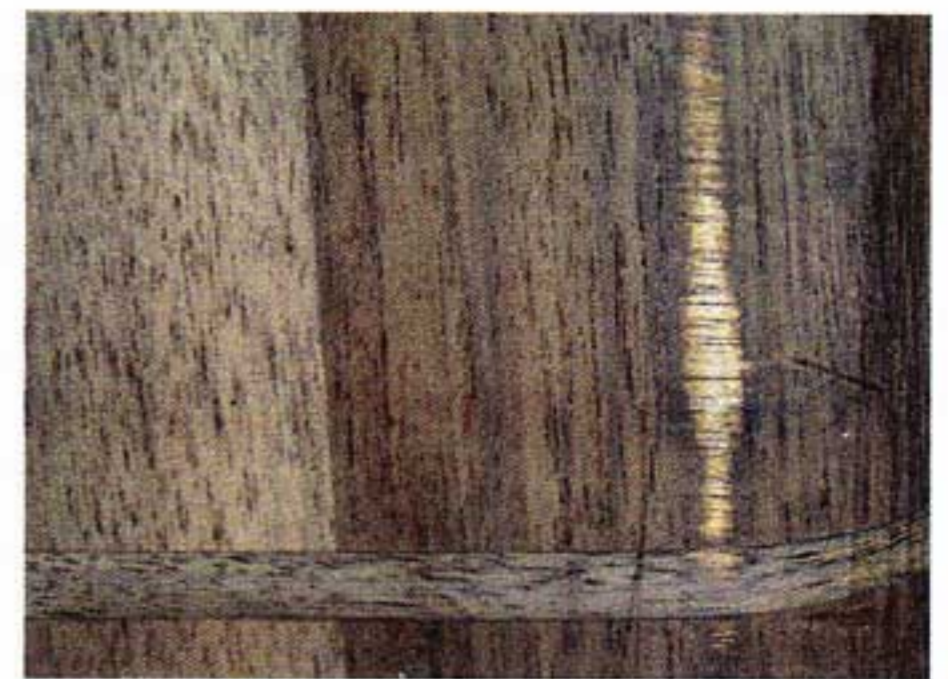
The next step finishing the cabinet was a bit slow and required two important ingredients, Patience and a nice dry day, as any hint of dampness in the atmosphere will spoil the job. The colour of the wood is about right so I didn't want to make it any darker so clear varnish is the one I used, previous experience on cleaning original finishes showed them to be less than shiny so I used the satin sheen variety rather than ending up with a toffee apple and finished it with Brasso and furniture polish to give it a final lustre rather than a shine. The first coat was thinned with white spirit, applied and left a full twenty four hours to fully dry and harden, many thin coats are best, if the varnish is too thick you leave brush lines and you won't be able to rub it flat. Don't be tempted to apply the second coat after four hours as it says on the tin as the next stage was to rub off the nibs



The missing piece of veneer



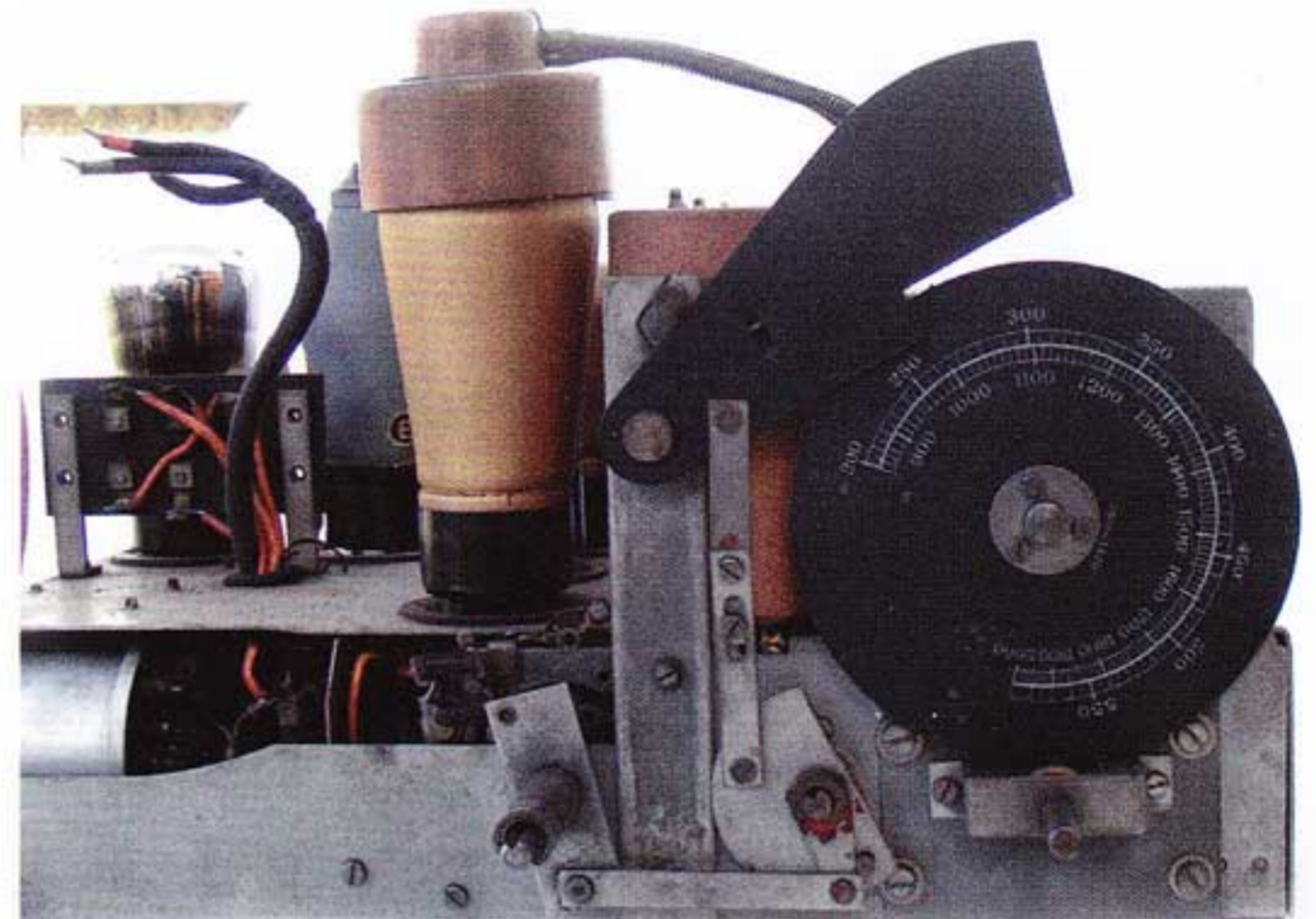
Veneer repaired



The veneer rubbing through



The inlaid veneer and tuning escutcheon



The tuning scale shutter mechanism



The fret end of the ply ready to paint

and after four hours the varnish is nowhere near hard enough to do this. (In this case I used a spirit based varnish I had in stock, modern acrylic based varnish can be thinned with water, In my experience I found drying and hardening times a lot longer). Stage two, The nibs rubbed off so the surface feels smooth to the touch, don't rub through the varnish just a light dusting with 1000 or 1200 grade cutting paper is all that's required, then the second coat was applied and again left a full twenty four hours, then the second rub down.

Stage three. The colour matching was adjusted, I used coloured varnish to slightly adjust the colour of the new veneer as the colour of the wood changes slightly when varnished, I only had the gloss variety to hand and had to apply two coats to get the colour right, with drying time in between, this done in this small area of new veneer only and rubbed flat with wet and dry cutting paper to remove the glossiness. The final level of gloss will hopefully be the same as the final coat.

Stage four, the third coat applied, when dry the cabinet looks good, about right

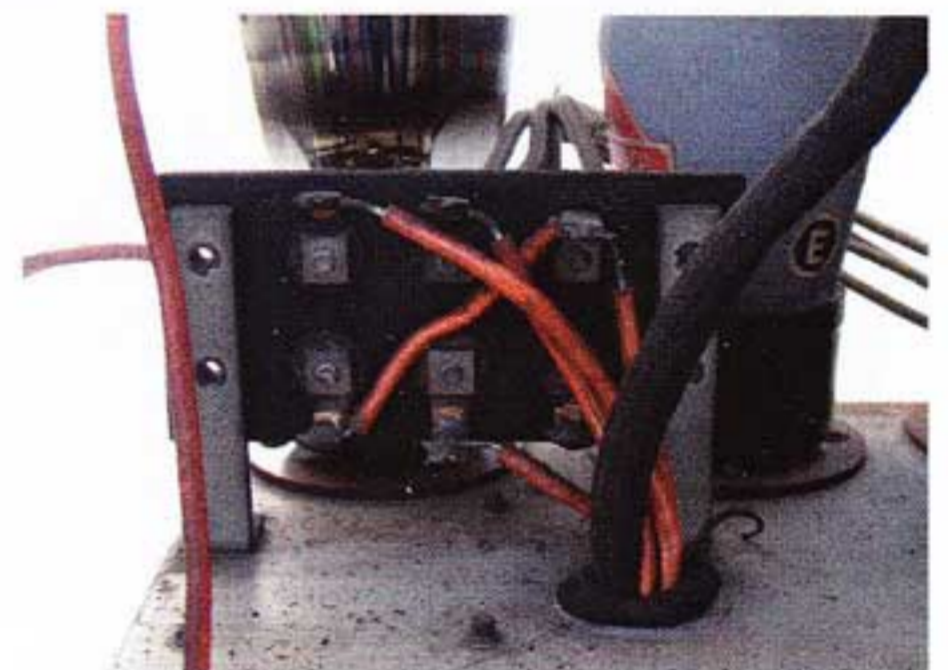


The speaker cloth glued and pinned

and feels smooth to the touch so this is the last coat, left two days to really harden then rubbed down with Brasso to give it a slightly higher level of gloss (but not shiny) and finished with silicone furniture polish to add a bit of lustre. It's never going to be perfect but I was very pleased with the result. The exposed plywood ends, now primed with Unibond, were painted with a similar brown paint to the original.

In the speaker fret two coats of matt undercoat were required to fully hide the plywood end grain and obtain uniform smoothness. On the ridge between the front and top the set the paint was over-lapped very slightly as the phantom sander had rolled off the edge of the veneer revealing a fine line of lighter plywood. The top coat of paint was a mix of colours, gloss and undercoat to get the colour and level of gloss right; modern paint usually needs toning down a bit as its always too glossy and colour rich. (Sometimes just a spot of matt black is all that's needed)

While the cabinet was being re-finished the speaker cloth was cleaned, ironed flat and humidity conditioned before it was put



The rear of the battery wire terminal panel

back into the cabinet. (I usually leave it in the garden shed until ready to refit, a damp place to undo the shrinkage when ironed and avoid sagging if ever stored in humid conditions). The speaker has a lip pushing the speaker cloth forward into a recess in the front panel but to avoid the cloth sagging I prefer a ring of glue around the outer edge to hold it in tension, drawing pins hold it in place while the glue dries. While the glue is drying I'll refit the wave change markers by tapping them back into their original holes with a small toffee hammer with some masking tape on its face to avoid damage to the new lacquer, with just a small touch of super glue to ensure they don't fall out in the future. The tuning escutcheon refitted and the cabinet is now complete.

After a bit of a clean I had a look round the chassis, all was intact, the Trader sheet (No 617) circuit shows there are no electrolytic capacitors and only a few paper types, so a run round with the AVO is next. Most of the paper types are sealed in a can which might prove difficult to replace but they are all ok (Leakage greater than 5 Megs), I then measured the battery rails



A spray of lacquer for the wavechange markers



Wavechange marker holes

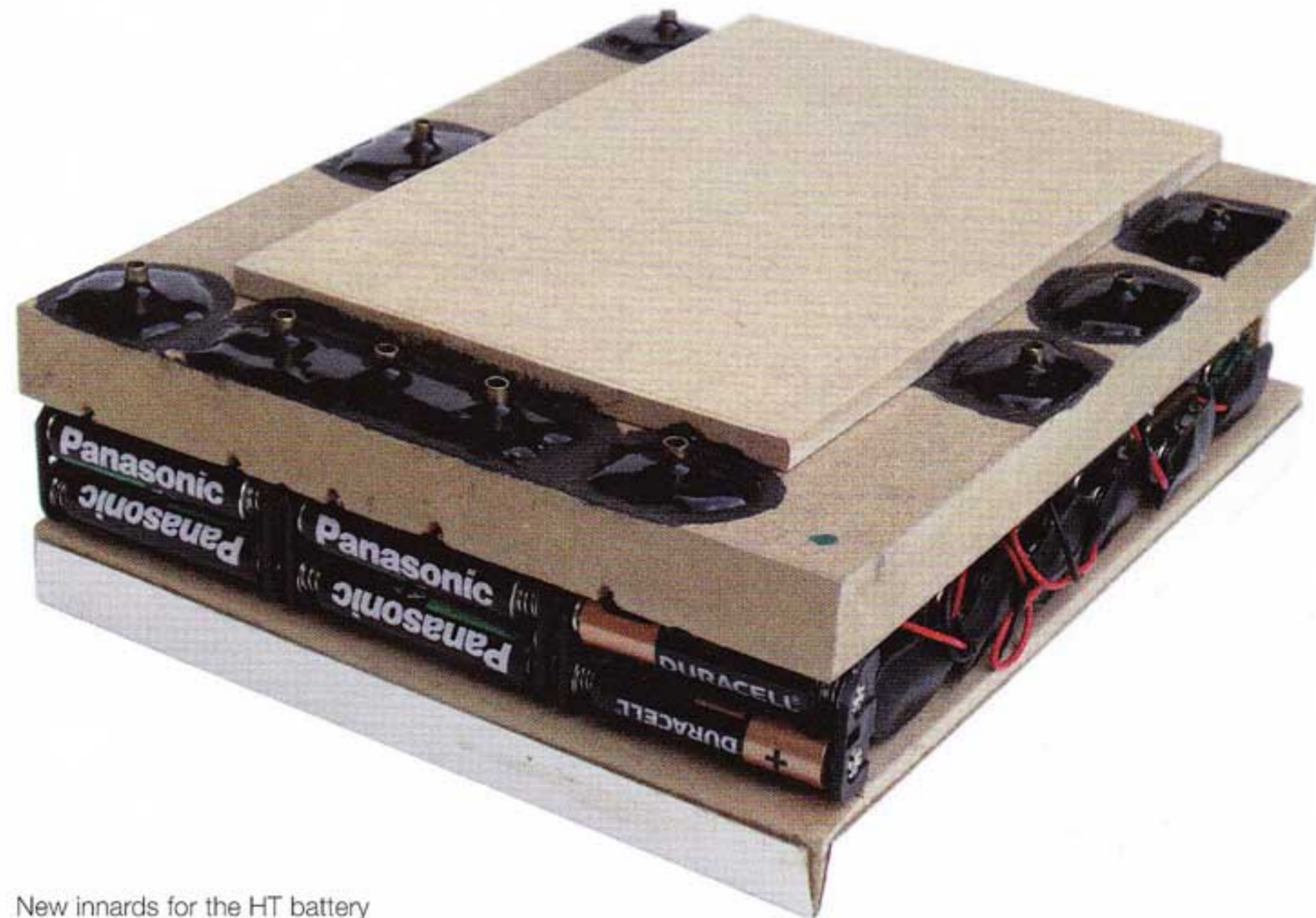
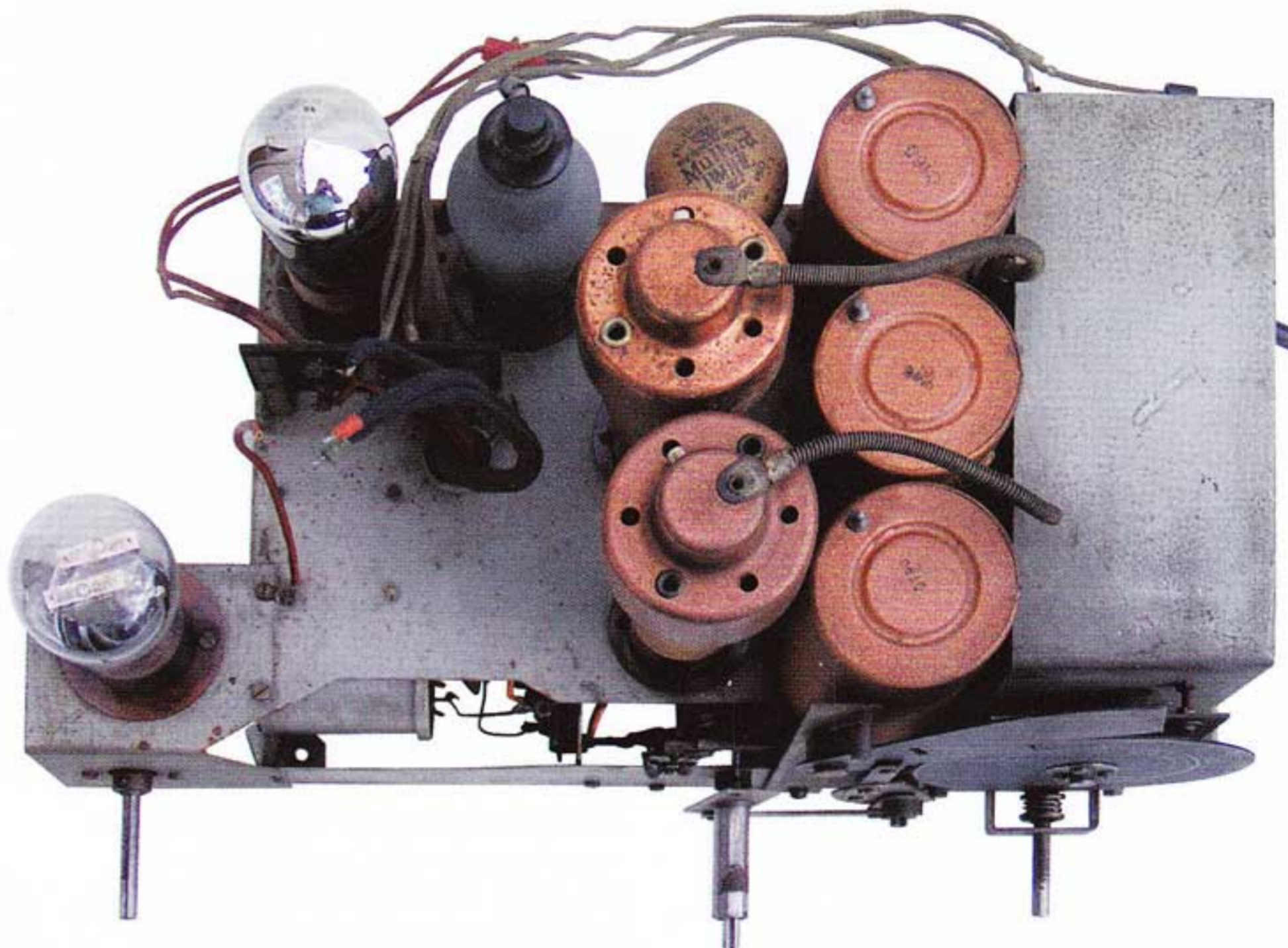
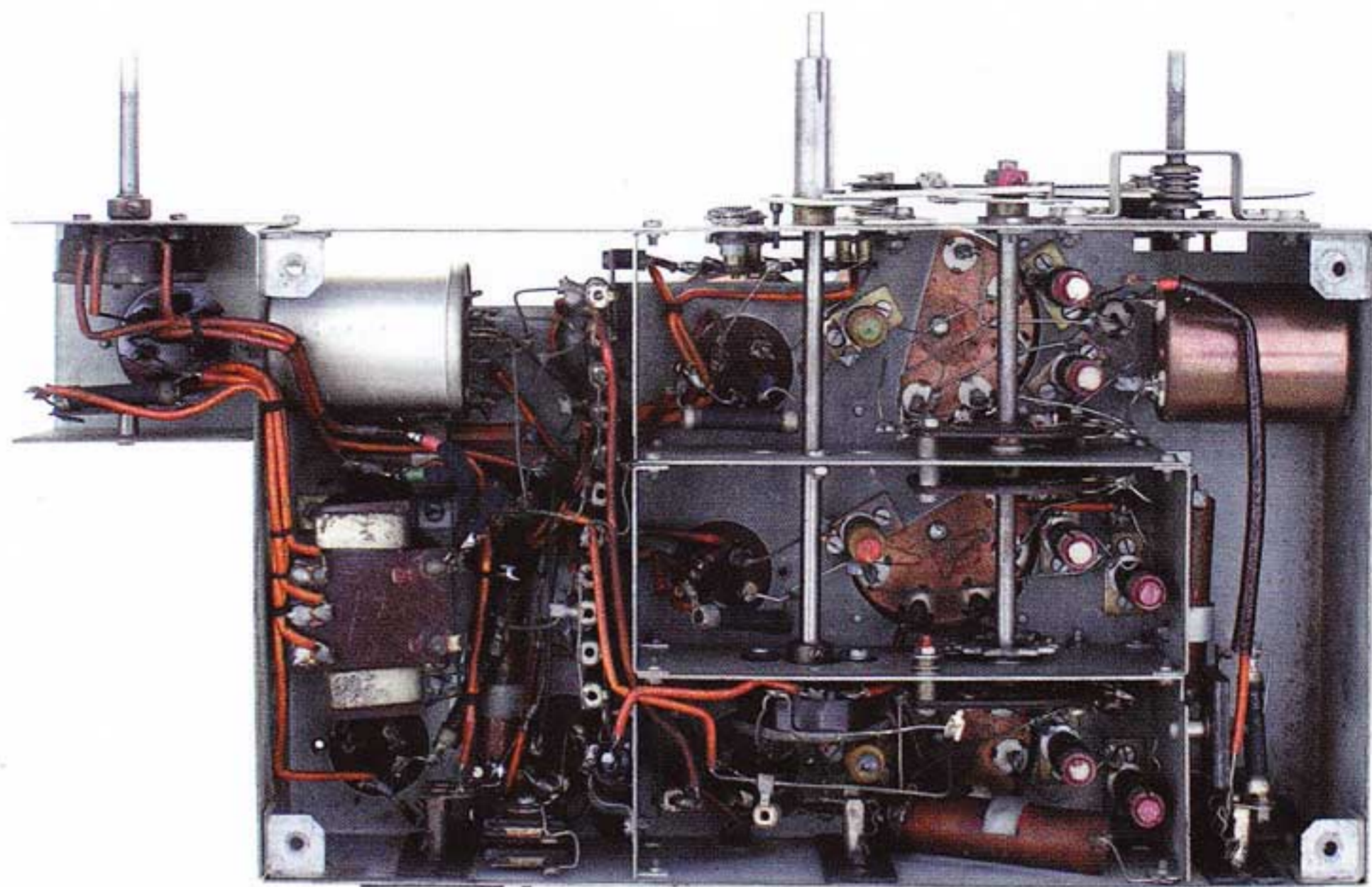


The wavechange markers in situ

to ground and there were no shorts so the next step is to check and connect the speaker and apply some volts. The speaker output transformer is attached to the speaker. This has a centre tapped primary as it's a push pull output and both halves checked ok with a good crackle from the speaker on both halves when the AVO was applied (You don't get the crackle with a high impedance DVM, it's not the same!). The speaker itself is in a protective cotton bag and as all is ok I decided not to disturb it and refit the whole assembly back in the cabinet, the safest place while working on the chassis.

I connected the speaker to the chassis via a piece of three core mains lead as a temporary extension and powered up the set from my battery replacement power supply on the bench.

On switch on I got a healthy microphonic ringing from the audio valves and a good buzz from the top of the volume control but not much else, running round the valve pins with the AVO proved all of the voltages to be within that quoted in the Trader sheet. The buzz stopped at the



New innards for the HT battery



The finished set

grid of V3 but looking at the circuit, this is strapped as a diode and doesn't amplify, it's just used as the detector diode.

Injecting the aerial straight into the control grid of V1 produced nothing but on V2 produced some faint results, swapping the two PM12's now produced nothing from V2 proving the PM12 now in V2 to be faulty; replacing the faulty PM12 solved the problem and the set came to life.

The moving coil speaker in the cabinet produced some quite mellow tones and the set performed very well, as all the valve voltages are about correct I assumed all of the resistors were still about their correct spec and none of the de-couplers were pulling any of the rails down. The HT current was about 10 mA about what I would expect from a push-pull output stage at a reasonable volume.

Running the set on its internal plate aerial in the top of the cabinet made the set very deaf but there is a diagram of the aerial requirements and how to use the water main as an earth on the back of the set, so I expect the plate aerial is for local stations only.

The grid bias is set by fixed resistors in a divider chain R19 thro R21, driving V2, V4 and V5 grids, I assumed the battery "C" plug would go in the full -9 volts tapping as the voltages were set by this divider chain. The AVC circuit biases the grid of V1 from the detector V3 anode. I later discovered from the Trader Sheet that the Battery "C" should be set to the -3 volt, tapping, this further improved the set's performance (although increasing the HT battery drain by a couple of milliamps).

The chassis is as original and only required a new valve to make it work, not bad for a 76 year old. I could probably improve its short aerial performance by replacing all of its capacitors but prefer to keep the set original and as manufactured, there is no evidence of any repair work and I would like to keep it that way.

There are a few nice features about this set other than the fine woodwork cabinet, there is a terminal panel for the battery leads making it very easy for the repair man to replace them when they get short, and they always do on battery sets as the wander plugs keep falling off and need refitting. All of the coils are sealed inside their screening cans as are the paper capacitors, protecting them from the elements, perhaps that's why it only needed a valve to repair it.

The tuning scale has a shutter blanking it out when the set is switched off so you will not run the expensive batteries flat, this employs some quite heavy mechanics for this relatively simple task with little chance to go wrong. The set also has a tone control, R18, or top-cut as I think they preferred to call it in those days.

The Accumulator, empty and dried out, has only two pole plates, these are in very good condition, almost new. (Most radio accumulators only have two plates as they're only required for low constant current drain for long periods, unlike a car accumulator, there's no requirement for short heavy current drain as in starting an engine).

There was a little evidence of debris and sediment in the bottom of the jar, this was

dislodged with a small piece of cotton cloth on the end of a wooden chop stick, easy when there's only two plates and plenty of space in between them, then flushed out with clean water before re-filling with dilute sulphuric acid and distilled water.

The dilution ratio is about 30% acid to water from neat sulphuric acid with a specific gravity of 18.50 down to 12.50, remembering to add the acid to the water in small amounts to avoid a violent reaction and having some bicarbonate of soda to hand just in case you need to neutralise any spillage. Luckily I was given about a pint of sulphuric acid by a fellow wireless collector several years ago, just waiting for an opportunity to use it on an accumulator rebuild, this was found to be already diluted when checked with a hydrometer.

The HT battery, a Drydex combination HT and grid bias, was also in reasonably good condition. 120 volts HT tapped at 108, 96, 84, 72, 60 and 48 volts for variable screen grid voltages, the lowest tappings for grid bias at 9, 7½, 6, 4½, 3 and 1½ volts. If maximum grid bias voltage of -9 volts is used this reduces the maximum HT+ to 111 volts (GB+ and HT- being the same point).

The set being a table model doesn't need the weight to be right as there's no issue with centre of gravity and balance as with portables, so it just has to look right.

The new battery was made from two pieces of 15mm MDF, cut to size and glued to a third smaller middle piece of wood, so the thirteen PP3 and six AAA batteries can be installed in the gap around the edge.

The middle spacer piece was cut to size so that the whole height of the battery is 5mm less than the inside of the cover, as the protruding terminals are inside of the cover. The terminal sockets were made from 0.5mm brass shim stock, about 20mm wide strip and wrapped round a 4mm drill to form a tube.

The top of the battery was marked out and drilled with 4mm holes for the terminal sockets, the brass tubes pressed onto these holes with about 4mm protruding through the top, leaving 1mm underneath to solder on the connecting wires, then fixed in place with touch of super glue. To finish off a small puddle of "Araldite" 2-3mm deep placed round the terminals and when set painted black to resemble the pitch used in the original battery. Finally a 5mm piece of MDF or corrugated card was cut to fit inside the terminal area stopping the cover from sagging onto the top of the battery. The battery was wired using PP3 connectors and AAA battery holders from Maplins. The battery now complete just needs the outer cover from the original to finish it off. I intend to make a reproduction battery cover for everyday use preserving the original but for now the original will do.

I purchased this set to fill a gap in my series of Super inductance sets, when I've finished playing with it I'll re-fit the original HT battery innards to the cover (they appear well dried out and mummified) and fit an empty accumulator while the set is out of use, and keep the restored one for current projects.