VINTAGE RADIO

By JOHN HILL

Rebuilding a vintage radio receiver

Collecting and restoring old radios is a fascinating pastime. The trouble is, all the really collectible equipment from the 1920s era is now in someone else's collection. However, there is another way.

Looking at things realistically, it is unlikely that I will ever get hold of the original Hertz spark transmitter and receiver, even if it does still exist. Alternatively, I could build myself a replica if I so desired. Having a replica is perhaps better than having nothing at all.

Replicas are big business in the firearm industry and one can buy at fairly reasonable prices almost any old gun that has been made in the last 150 years. Frontier Colts, cap and ball pistols and muzzle loading Enfield rifles are particularly popular.

Replica radios

In recent years, nostalgic replica radios have appeared in shop windows (and will most likely stay there). These radios can be bought for around $80 and are transistorised AM, FM receivers with miserable little 75 millimetre loudspeakers. The cabinets look nothing like they should and the general effect is far from realistic.

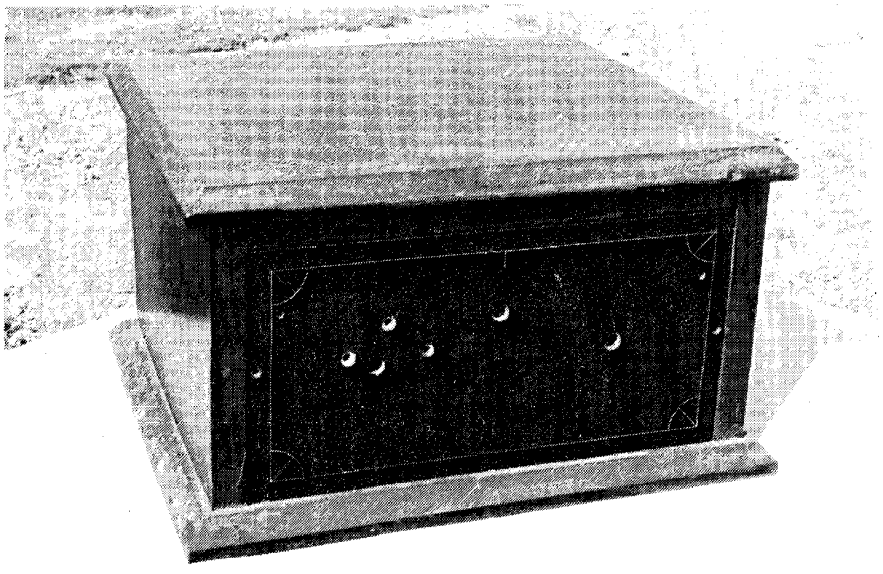
In fact, these modern "replicas" have no real resemblance to the valve sets they are supposed to emulate. Unlike replica firearms (which are perfect in almost every detail), replica radios offer the collector absolutely nothing!

But perhaps one shouldn't snub replica radios too much because the real thing is becoming increasingly difficult to find. Receivers from the 1920s era are just about entirely in the hands of collectors and if an early set is found in someone's shed, it will generally be in such poor condition that it may not be of much use.

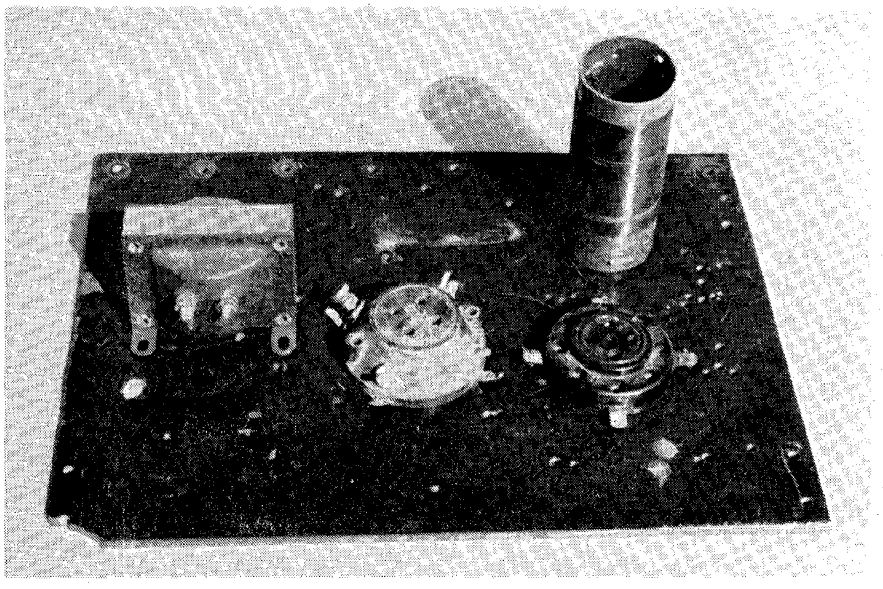
I recently found a derelict mid-1920s 3-valve radio that was in a really sad state of repair. As far as I was concerned, the solid timber cabinet with its hinged top was about the only useful part. The dials on the front panel were smashed and the circuit board had been altered so many times that it was impossible to tell what was original and what was not. It looked as though at least a dozen experimenters had tried to get the set working again with none of them succeeding in their task.

Regardless of the old set's state of disrepair, I swooped on it like a hungry vulture. Although it was pointless to try to repair the original receiver, I could see great possibilities in it for a complete rebuild job. What I had in mind was to use the cabinet and its front panel and build a completely new circuit on a new baseboard.

The original plan (complete with the necessary bits and pieces) was to build a receiver with a stage of radio frequency amplification in-



This is the original 1920s-style cabinet into which the new receiver was built. A brass plate under lid reads: "Supplied by D. W. Reddan, 183 Smith Street, Fitzroy. Receiver type C". It would have been made in about 1925.



The original circuit board had seen better days. It was scrapped and a completely new circuit constructed on black acrylic sheet instead of the more traditional (and more expensive) Bakelite.

The valves used in the new receiver were 2V Marconi triodes, although 4V or 6V valves would have been a little more appropriate. The valve on the left is a power output type.

corporating two matching single gang tuning capacitors and two matching tuning dials. This project would have been possible but only with great difficulty. The space on the front panel and particularly inside the cabinet was really too small for such a receiver.

After considerable deliberation I settled for a more standard type of 3-valve receiver for the mid 1920s: a detector with two stages of transformer coupled audio.

Such a set would naturally have battery powered triode valves in it which should drive a horn speaker at reasonable volume on local stations. Interstate listening may be a bit feeble but headphones should solve that problem if one really wants to persevere.

Regarding the headphone aspect, the set was designed with two audio outlets; one on the front panel for headphones and the other on the main circuit board terminal strip for the speaker.

The valves used were 2-volt Marconi triodes which were perhaps a bit modern for a mid-1920s replica. Either 4V or 6V valves would have been a little more appropriate. However, as the valves and the base board type valve sockets were already on hand, they seemed the logical choice.

As few people have any idea as to what a 1920s radio receiver looks like inside, I'm not going to let the 2V valves worry me. While my replica radio won't fool everyone, it is bound to fool most — especially if I don't disclose any of the details.

Component details

The rebuilt set ended up really looking the part. This is mainly due to the fact that vintage components have been used in the circuit. These included hard to get items such as a gridleak capacitor with built in clips to hold the gridleak resistor.

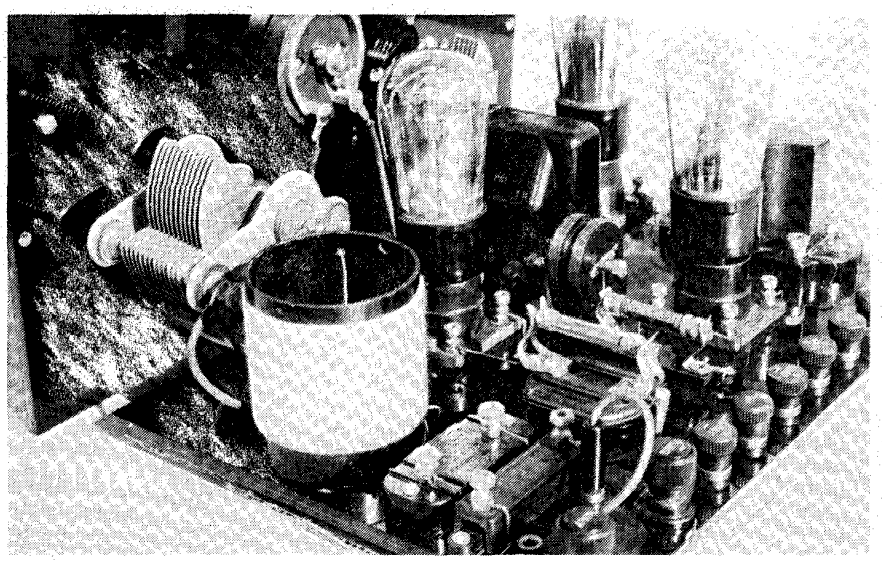
The gridleak resistor itself is open circuit, so a substitute 2MΩ 1W resistor is wired in underneath and out of sight. In addition, two of the fixed capacitors have been doctored by fitting smaller modern types inside them. The tuning capacitor is the set's original and has been scrubbed up with metal polish to highlight its brass and aluminium construction. A small 100pF variable capacitor from another old radio receiver serves as the reaction control.

Two audio transformers of the same make and condition would have been nice but I had to settle for a Philips and an Emmco. I also had to use a 20Ω filament rheostat instead of the usual 6Ω type. The final non-standard feature is the circuit base board which is black acrylic sheet and not the traditional Bakelite. Large sheets of black Bakelite are not only expensive but also hard to find.

Improvisation

Improvisation is the name of the game. Ancient radio components of 1920's vintage are almost unprocurable and one simply has to make do with whatever is available. If it looks something like the bit required, use it!

The horn speaker that accompanies this set is also a hybrid and consists of a Brown driver with a



The unit works well despite being a collection of miscellaneous bits and pieces. Several of the components have even been doctored by fitting smaller modern components inside them.

fancy horn of some unknown make sitting on top. Because the rest of the set is a really a phony, it is only appropriate to continue the hoax by coupling it to a mis-matched horn speaker.

Although my vintage rebuild is nothing more than a lot of odd bits, the damn thing works despite the fact that no two components came from the same radio. It's like Frankenstein's Monster — created from miscellaneous bits and pieces. The analogy is such that I refer to the set affectionately as "Frank".

As mentioned earlier, finding 1920s radio receivers in good condition is fast becoming an impossible task. The vintage rebuild technique is one way of obtaining a reasonable vintage radio that looks the part to some extent. That must be better than just having an empty cabinet or an unrealistic reproduction.

Only a close examination of Frank would reveal his true ancestory and very few people would be able to tell the difference. Frank is only a phony in my eyes because I know his shameful past.

Sound quality

In actual fact, my creation did not work that well at first. Although volume levels were as expected from a 3-valve battery receiver, fidelity was pretty poor to say the least.

Sound quality is often lacking in vintage radios. Indeed most of the early sets are harsh, toneless and hard to listen to. The literature from the 1920s often refers to differences of opinion regarding the pros and cons of transformer coupled audio stages compared to resistor-capacitor coupling. The usual conclusion was that transformer coupling gave high gain and poor fidelity, while resistor-capacitor coupling gave less gain but better fidelity.

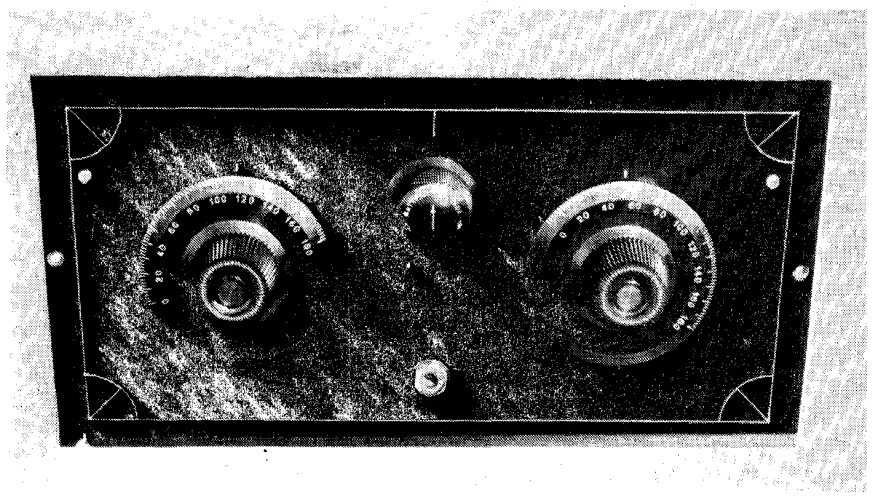
In fact, it's a bit of a laugh to even mention the word fidelity when discussing the tonal aspects of horn speakers. Believe me, the sound reproduction of horn speakers varies from poor to terrible. In Frank's case, the sound was terrible and I decided to do something about it.

The first step was an experimental bypass of the audio transformers. These were both disconnected and the three valves resistance-capacitor coupled. The end result was worse — fidelity was still terrible but with a little less volume than before.

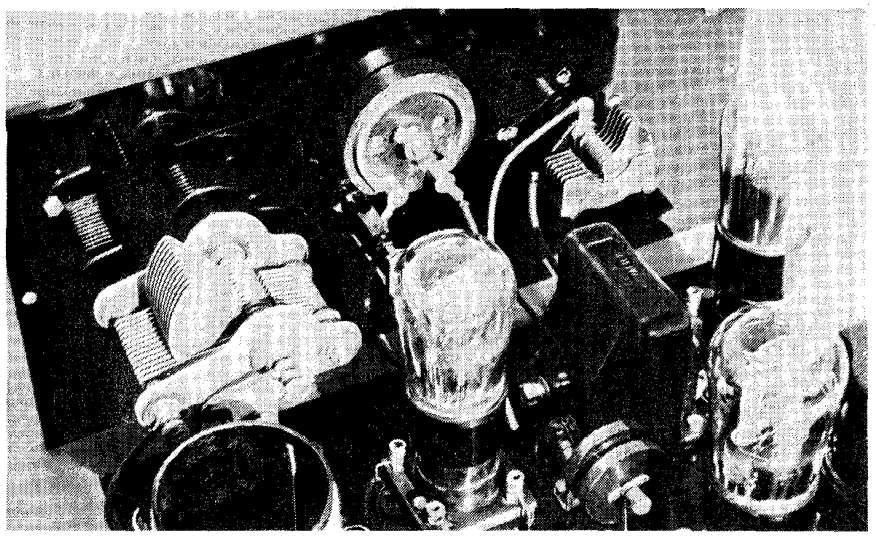
Several checks of the wiring did not reveal any wiring errors and I was at a loss to know what was wrong. I could only guess that the valves I was using were not really suited to the task I was expecting them to perform. The only alternative was to rewire the circuit the way it was originally, using audio transformers to couple the last two valves. At least the set performed a little better that way than it did with the so called improvements.

I had tired of all this wiring and rewiring and Frank lay on the work bench for a couple of weeks unattended. This is a good approach to any problem — simply ignore it and it might go away. Well the problem didn't go away but while Frank was laying there in limbo, I was thinking of other things I could do that might help improve the sound quality. I decided to experiment further.

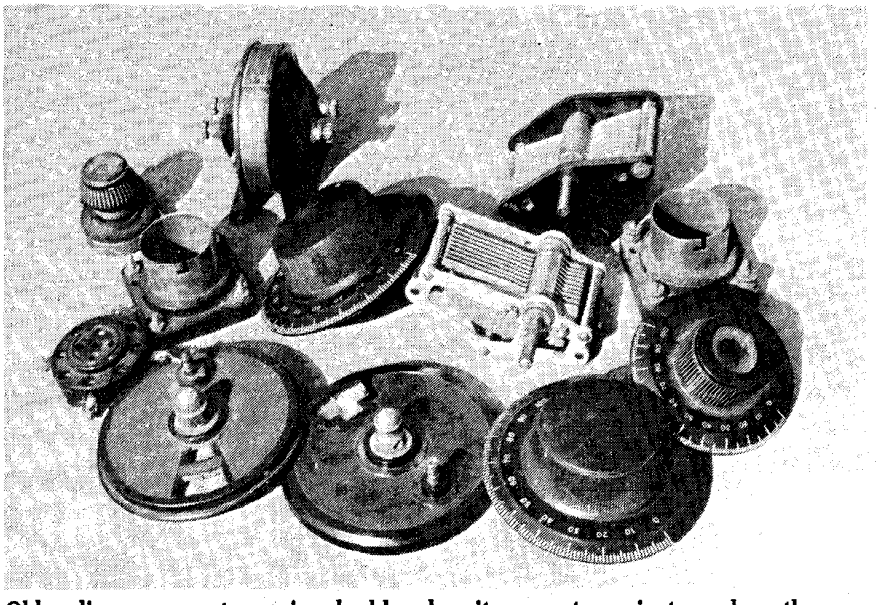
In the end, a bit of a juggle with the "C" battery voltage and the detector plate voltage did the trick. In particular, the sound clarity im-



This view shows the new front panel layout, complete with dial knobs, rheostat and headphone jack. Improvisation is the name of the game when restoring receivers from the 1920s, as many of the parts are now no longer obtainable.



Close-up view of the front panel. The tuning capacitor on the left is the only original component used in the rebuilt set. A smaller 100pF variable capacitor from another old receiver serves as the reaction control.



Old radio components are invaluable when it comes to projects such as the one described in this article. This miscellaneous collection includes dials, knobs, valve sockets, rheostats, tuning capacitors and an audio transformer. Restoring these items is a time-consuming job.

proved greatly when the "C" battery voltage was reduced from 4.5 to 3.0 volts.

At this stage of the proceedings the set was installed in its box and placed on a shelf. It will stay there until I can find time to restore the cabinet.

Vintage cravings

When I first started collecting old radios I craved for some of the early sets from the mid-1920s era. Now that I have a few of these sets (plus Frank), I can only say how disappointing they are from a listener's point of view. Listening to radio programs using ancient receivers and horn speakers is not particularly pleasant or enjoyable. A novelty yes — but that's as far as it goes.

My excursion into 1920s listening has made me appreciate all the more those nice old superhets from the 1930s era. It is my opinion that this generation of receivers is equally as collectible and far more listenable than those ancient receivers from the previous decade. EC