K9YA Telegraph

Robert F. Heytow Memorial Radio Club

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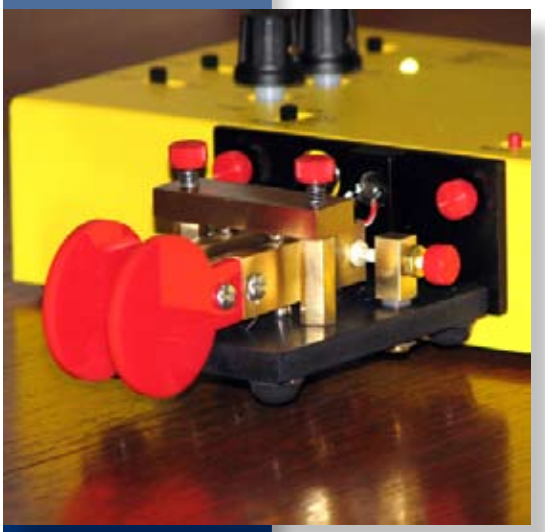

Arachnid's Lullaby

Baby Black Widow Paddle Kit for the PFR-3

Philip Cala-Lazar, K9PL

Meet the youngest member of the Black Widow iambic paddle family, the Baby Black Widow. Specifically designed by Jerry Haigwood, W5JH, for the Hendricks PFR-3 QRP transceiver. Nonetheless, it is perfectly and easily adaptable to any rig with a built-in keyer or with standalone keyers. (See: *K9YA Telegraph*, October 2006 and October 2008.)

I ordered the kit via USPS on a Monday and it was in my mailbox that Saturday–now that's great service. The arachnid family resemblance is immediately apparent in its individual components, materials and in the completed telegraphic instrument. And complete it you will, as it is available in kit form only.

"…on the go and on-the-trail…"

As received my Baby Black Widow kit comprised the same high quality parts and materials as the original Black Widow and, very pleasingly, no missing parts. Like the big Black Widow its arms are suspended and positioned by four ball bearings secured by an adjustable tensioning bar. Unlike the original version that uses both magnets and a spring to motivate its arms, the Baby Black Widow relies solely on a spring.

The two silver-plated contact gaps are screw-adjustable and locked in place with brass nuts. I use a ¼" Craftsman® ignition wrench to tighten my key's contact gap locknuts. Larger diameter, knurled, locknuts would make a great modification to simplify on the go and on-the-trail gap adjustment.

Detailed assembly and finishing instructions are included on a CD, as is "Using an Iambic Paddle," an eight-page discourse on the art by Chuck Adams, K7QO. Before assembly the already finely machined brass parts require some rather minor sanding with 200 grit followed by 400 grit sandpapers. You can stop there or continue on to a mirror-like finish with increasingly finer grades of wet or dry sandpapers and buffing with metal polish. Preserve the paddle's appearance with a few coats of lacquer, or the finish of your choice, and the kit is ready for assembly.

For my paddle I continued sanding with 600, 800 and 1000 grit wet or dry sandpaper supported on a plastic cutting board and used wet under a trickling faucet. The brass parts were already quite highly polished by the previous finishing steps and so required very little additional sanding to achieve the finish I wanted. I then thoroughly dried the parts with a hair dryer and finished up with three coats of spray can Minwax® lacquer.

Assembly time occupied about one hour, including soldering four wires, with everything fitting as designed.

The paddle's brass parts are mounted on a hefty black anodized frame that plugs directly into the PFR-3's

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Inside This Issue…

Philip Cala-Lazar, K9PL
Editor

Mike Dinelli, N9BOR
Layout

Dick Sylvan, W9CBT
Staff Cartoonist

Rod Newkirk, VA3ZBB
Contributing Editor

Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

Thoughts on Regen Receivers

Paul W. Ross, W3FIS

MFJ-8100 Regenerative Receiver Kit

Everybody is likely familiar with the original Armstrong design—tickler coil for feedback, "throttle" with a variable capacitor RF bypass from plate to ground, etc. Keep that in mind, as this discussion progresses. If you aren't familiar with the basic design of a grid lead detector, "tickler" feedback and regeneration control with a variable capacitor, look this up. Actually, Armstrong's original circuit was slightly more complicated, but the scheme I've mentioned covers the basic design ideas.

One needs to keep firm in mind that early receivers were governed strongly by cost and complexity considerations. Early vacuum tubes were expensive, and parts generally difficult to come by. Also, simplicity was a major consideration, as the more complex something is, the less reliable it will tend to be.

"Well, here goes…"

The following discussion applies to vacuum tube designs as well as their modern cousins with bipolar and field effect devices. They really differ only in the details. Every person has their "pet" designs, of course, as do I. Well, here goes...

The fundamental idea of a regenerative detector is to introduce controlled positive feedback. This does the following:

- It effectively increases the "Q" of the tuned circuit by the concept of "negative resistance." Typically, an oscillator circuit, such as a Hartley, Colpitts, or the like, is chosen. One then sets the loop gain of the oscillator circuit by some means to be just below the point of oscillation.
- The circuit may run in "oscillation" mode to act as a direct conversion or autodyne detector for CW or single sideband signals. The oscillation mode effectively provides the BFO for direct conversion of the input signal.

The real problems in any design are:

1. Interaction of the regenerative detector with the antenna.
2. QRM generated by the receiver itself. "Grounded Grid" or an equivalent isolation amplifier does the trick here. An un-tuned grounded gate FET amplifier seems to be the modern choice.
3. There is massive interaction with tuning as a function of regeneration setting. If there is a way to separate detection from regeneration, this problem can be addressed. One typical vacuum tube design used a Colpitts oscillator in parallel with a plate or grid leak detector (my favorite for vacuum tube designs). Another alternative (my senior EE project in 1960!) was to insert a cathode follower between the tuned circuit and the detector/feedback vacuum tube.
4. Smooth regeneration. This is the hard nut to crack. There is no really good answer here, in my opinion. A well-regulated power supply to the regeneration stage helps a great deal. I note that one commercial regenerative receiver simply uses a separate 9- volt battery for the detector, and a second for the audio amplifier.

The decoupling of the tuned circuit from the antenna serves two purposes. First, it reduces the interaction of the antenna with the detector-tuned circuit. If you have ever hooked an antenna analyzer to a random wire antenna, the impedance is all over the place. Investment in a good antenna tuner will do the trick. The coupling of a resonant antenna into the detector can often lead to "dead" spots in tuning. Hence, the advantage of isolating the antenna from the detector with a "front end." Another function of the isolation is to reduce radiation from the oscillating detector from producing QRM for other radio users in the vicinity. Do you want to get to know your neighbors?

Along with the simplicity issue, the design for convenient band switching of the detector's tuned circuit is a hassle. These switches are expensive, and add a large measure of complexity and increased size to the

Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

receiver. There are at least two common solutions:

Plug-in coils are the classic solution, but clumsy to do, and you have to have some place to conveniently store the unused coils. If you note pictures of early commercial sets for marine use, there was a coil box near the receiver.

A design that uses only a *single* coil in the tuned circuit such as the Colpitts design is one such solution that greatly reduces the complexity of band switching. Of course, a Hartley oscillator design uses a single coil with a tap on the coil, but again, this is an additional source of complexity due to the tap.

The MFJ-8100 receiver kit has a series of inductors in series with a simple single pole selector switch. The Ten-Tec 1253 receiver kit uses nine separate inductors, but switches them with a clever PIN diode and counter circuit. Both of these designs use an isolation "front end," which deals nicely with coupling into the tuned detector circuit. The decoupling is good, but not complete.

It is generally agreed that designing a receiver for a single or small range of frequencies is much easier than developing a general coverage receiver. If you can get a 10:1 range of capacitance change with a variable capacitor, then you can expect about a 3:1 tuning range (square root of the ratio of the maximum to minimum capacitance). This problem rears its ugly head especially in the case of varactor tuning, where the capacitance change range is more modest.

The usual approach to fine tuning, when using a variable capacitor is to have a "band set" capacitor and then a "band spread" capacitor of about 10% of the value of the main capacitor. An alternate approach is to use a mechanical vernier reduction drive, such as is done with the MFJ-8100. With varactor tuning, a secondary variable voltage source with a smaller voltage variation range serves the same purpose. Charles Kitchin uses a combination of varactor (fine) and variable capacitor (coarse) tuning in his designs. The Kitchin design appears in a kit marketed by Hendricks QRP Kits (**http://qrpkits.com/scoutregen.html**). I haven't had a chance to work with that kit, as yet.

As to controlling the regeneration, any scheme that allows you to control the feedback will work. The more common themes:

- Armstrong "RF" throttle—another expensive variable capacitor.
- Variable resistor across the tickler coil—"kill" some of the feedback signal. My original 1T4 regenerative receiver used this scheme.
- Change the filament voltage! This was used in many of the early directly heated filament tubes.
- Change the screen voltage in a pentode. Probably one of the cleanest strategies. This is used in the World War II Paraset design.
- Change the coupling between the tickler and tuning coil mechanically. This leads to mechanical complexity issues.
- Add a variable resistor in the emitter circuit of the detector (Kitchin's design uses a Hartley oscillator and a separate diode detector.)
- Change the plate voltage of the detector.

Ten-Tec 1253 Regenerative Receiver Kit

"World War II Paraset Design"

Where I live in rural "Slower Lower" Delaware, it is hard to get electronic parts other than at the local Radio Shack store, unless I do a lot of mail ordering. As a consequence, getting back into radio after a 30+ year hiatus, I opted to go the kit route for my initial recent efforts in regenerative receivers. There are a couple of clear advantages to kits—all parts are included, and the design is liable to work the first time 'round. Any modifications on my part could be done with ease, either during construction, or later, as I might choose.

For my first regenerative receiver kit, I chose the Ten-tec 1253. The band-switching scheme uses a series of inductors switched by PIN diodes and a counter. It also has nine bands. This appears to be mostly due to the rather limited tuning range with the varactor diode. It covers from the low end of the 160-meter band up through 13 meters with a few unimportant gaps.

Fine tuning on the Ten-Tec 1253 is done with an additional voltage control on the tuning varactor. You just have to remember to return the fine-tuning

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www.k9ya.org
telegraph@k9ya.org

Volume 6, Issue 9

My Most Interesting QSOs

Stu Sokolin, W6TA

Stu Sokolin, W6TA

In the June 2009 *K9YA Telegraph* I came upon a request asking readers to write about their most interesting QSO. I thought this an excellent idea as every ham has a story to tell if they have spent any time on the air at all.

I offer two interesting situations: one from the past and another from the present.

From the past: Talking to Bob Heytow, K9YA, between Chicago and Los Angeles, every Sunday morning for over a decade, was a major highlight in my amateur radio career. Knowing Bob since I was 12 years old and growing up together as friends, fellow hams, and being best buds for so many years. I was K9QCU back then and Bob was K9YAX, both living in Chicago in the late 50s and early 60s. Those were some great times we had and we continued our friendship even after my move across the country in the mid-60s. Bob even came out to live with me for a year in Los Angeles before going back home to enlist in the U.S. Army and ultimately serving in Vietnam as a field radio operator on the front lines. Just imagine having a sked with your best friend every week for years and then he's gone. Just like that your life changes forever. Your perspective of life changes forever too. Bobby we miss you and still think about you often. Your picture still remains on my ham station shelf and I look at it every time I'm operating. Bob was a great person, a great friend and a great ham radio operator to boot. We'll never forget you Bob, and carry on your legacy through the *K9YA Telegraph*. R.I.P. Dit, Dit

> *"…we need to tell the world."*

Now, for the present, which just happened last week. Upon turning 65 years old on May 16 of 2009, I officially attained "OT" status and was feeling it more mentally than anything else. I decided to make this a regular type day and started out on the radio that morning. Tuning the dial I happened upon an operator talking to a DX station. The stateside station's callsign caught my attention, so I looked it up on qrz.com. Doing so I noticed the callsign holder's birth year was 1914. Doing some quick math I felt this must be an error and decided to move the stateside station up 5 to ask him.

To my pleasant surprise Ben, W2BXA, was for real. Yes, 95 years young and still going strong. He definitely didn't sound 95, but how does a 95-year-old person sound? He was sharp, spry and turned out to be an extremely interesting person to talk with.

Imagine still being able to do CW at 35-wpm at 95. Just being able to do anything at that age is amazing. He was first licensed in 1929 at the age of 15. He skipped high school one day and snuck down to the local FCC office in NYC to take his exam. That was right around the time of the Great Depression, when people had more important things on their minds than amateur radio. Ben has held the same callsign ever since. Yes, for over 80 years Ben has been W2BXA. We ended up having a QSO for close to two hours, and could have gone on longer if not for the fact I had to move on with my birthday.

I find talking to older hams and getting a perspective on how things were in the past extremely interesting. They are the service's pioneers, and we owe everything to them for making ham radio what it is today. My point in this whole story is I was really feeling down, turning 65 and feeling sorry for myself, and now I was able to talk to a fellow ham 30 years my senior who was so full of life. It made my 65th birthday more meaningful and helped me to get through the day with a smile on my face. Hey, if Ben can do it, maybe we all can last that long and be productive citizens and great amateur radio operators at 95 too. Talking to Ben was a very uplifting experience, and gave me a new outlook on life. What the heck, 65 is just a number. I have at least 30 good years left, or as hams would look at it, two to three solar cycles left to go.

Amateur radio is a wonderful hobby, and we've all had interesting experiences. Let's share them with the world. I challenge you to create your story about this wonderful hobby. Everybody has a story to tell, and since the *K9YA Telegraph* is asking, we need to tell the world. ■

Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

The Devil Knows Morse Code

Bob Cashdollar, NR8U

When my son was younger, pre-school age, we used to sit together and watch The Disney Channel®. Every day there would be a half hour of Donald Duck cartoons and we both enjoyed the antics of the Duck.

One day, as we were watching the daily cartoon show, I got up to go out in the kitchen to refill my coffee cup. As I was topping up my cup, I heard the distinct sounds of Morse code. I rushed back into the television room in time to see Donald listening to a devil, which looked like him, talking to him out of a rural mailbox. I sat and watched the rest of the cartoon, but there wasn't a repeat of the Morse code.

Research

Over the next several months I watched the half hour Donald Duck cartoons religiously. The cartoon with the Morse code was never repeated, at least during the times I watched. Over the years I checked with people I knew who had children and watched the Disney Channel®. No one could ever remember seeing this particular cartoon. I even described it to my amateur friends, but their response was usually, "Sure you heard Morse code," and a rolling of the eyes and shaking of their heads. Gradually the search for the Donald Duck cartoon with the Morse code in it slipped into the background of my life.

"CQ HI KID"

Recently I visited my local library and checked out things in the video department. Lying on the return cart was a thick DVD case with the picture of Donald Duck on it. The title of the volume was: DISNEY TREASURES: THE CHRONOLOGICAL DONALD, Volume 1: (1934-1941).

I started watching the cartoons and eventually came across one called, DONALD'S BETTER SELF. The plot of the cartoon has Donald stirring to get out of bed and go to school. Donald's better self, a Donald look-alike with a halo, gets the duck up, but another Donald look-alike, this time with horns, convinces him to go back to sleep. The "good" Donald gets the Duck up and going towards school. On the way to school, Donald comes upon a rural mailbox. As he approaches the mailbox, it starts to sway and the red flag on the side beats out *CQ HI KID* in Morse code. Out pops the devil duck and he convinces Donald to play hooky instead of going to school. The rest of the plot has Donald's better self winning out over the devil self and Donald eventually going to school.

Bob, NR8U, and Vince Cashdollar

I was curious as to just how Morse code came to be used in a Disney cartoon. I checked out books on Disney and Disney cartoons through my local library, but didn't find any references to Morse code or amateur radio in the books. I did find some interesting facts about the Disney studio system in the 1930s. Nearly all the Donald Duck cartoons of the 1930s and '40s were done by a single group of writers, directors and animators.

Duck Unit

In the case of DONALD'S BETTER SELF, the director was Jack King, the writer was Carl Banks, and Jack Hannah, Ed Love, Paul Allen and Charles Couch did the animation. They were sometimes referred to as the Duck Unit. King has a long list of credits as director of Donald Duck cartoons. Banks did not last too long in the Duck Unit, but went on to create Scrooge McDuck comic books and a number of supporting characters in the Disney cartoon universe.

I never did manage to find out how Morse code came to be in a Donald Duck cartoon. Maybe the next time you work that station and the ops fist is just a little too perfect, you could ask him. ■

Robert F. Heytow Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

An Oddball Vertical - Part II

Room for One More Stick on Uncle Harold's Roof

Rod Newkirk, VA3ZBB/W9BRD

The Green Hornet on Clark Street in Chicago

My weird oversized vertical—a 44-foot radiator center-fed with flat 300-ohm twinlead—gave a good account of itself on 20- and 10-meters in the winter of '48. I could work anything I could hear if the pileups weren't too deep. I was creeping toward DXCC membership with about eighty countries worked. Not bad for fifty CW watts and 30 on a.m. W9SH could see my antenna three miles down Clark Street and didn't like the sound of my audio. I was using a war surplus tank mike and the squeezing was crackly. He parked his Bell service truck outside and rigged me up a stand-up single-button microphone out of abandoned odds and ends. Now I sounded like the Voice of America.

Improvements

But hams are always on the lookout for something a little better. I noticed some articles on phased verticals for the lower HF bands, usually grounded. I wondered how the idea would work with freestanding verticals. I had enough junk box components to give it a try. That spring I put up a second vertical, a duplicate of the first. I used wide sixteen-foot spacing in an east-west line so as not to disturb impedances too much. One feed line was sixteen feet longer than the other, to be transposed in the cellar shack with a knife switch to vary directivity east or west. The two feedlines were three feet apart in the 120-foot run to the cellar ham shack. Twisting them minimized interaction.

Initial tests were exciting. I found that my horrendous noise floor was 90 percent from the east, the business district. The west, mainly residential, contributed very little. It was working! The pattern for both bands was a blunt cardioid so I couldn't expect much forward gain, maybe a couple of S-units. The front-to-back ratio was a real revelation, though. Robust signals would completely disappear or become ghostly echoes. Directivity in the vertical plane was amazing. I could hear auto noise from street intersections a mile away. My noise blanker would be working overtime.

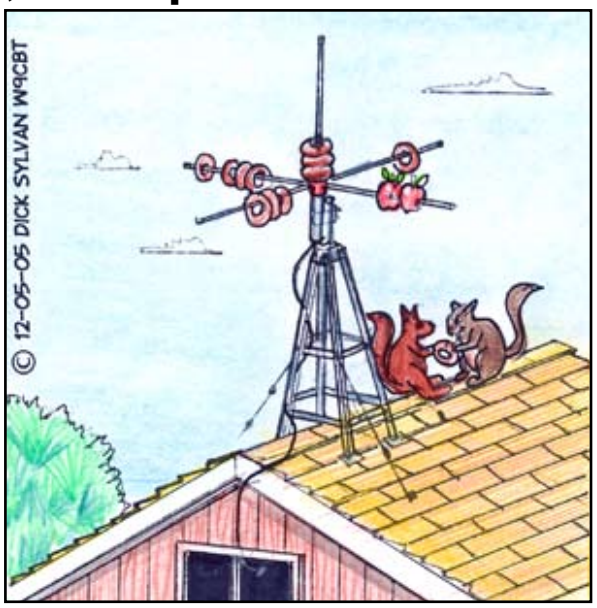
Results

The operation was a tremendous success. Tests with antipodal VK6HD established that both short and long paths were usually open. I could easily do battle with tower-mounted yagis now. In a few months I had worked 150 countries and confirmed 132. DXCC was mine. Uncle Harold's roof looked much like a Yankee Clipper under furled sail but he took it well in the interests of science. My handiwork had to come down a year later when I got an out-of-town job. That was *some* skywire. Weird but wonderful.

Rod's rapier sharp wit, good-natured humor, depth of knowledge and brilliant prose made QST*'s "How's DX" column a must-read for decades; he is a member of the CQ Amateur Radio Hall of Fame; and coined the expression "elmer" for ham radio mentor. Rod's articles have graced the pages of the* K9YA Telegraph *since September 2004 and we are privileged to be able to offer his articles to yet another generation of amateur radio operators.*

Ham Quips

DICK SYLVAN, W9CBT



SQUIRRELING IT AWAY!

Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org

control to the center position before you move up or down the band when scanning for additional stations.

The only clear problems I experienced with the Ten-Tec 1253 were:

- Lack of a shielded antenna connection: I added an SO-239 chassis connector to replace the binding post. A random length wire can be attached to the SO-239 through a banana plug, or you may connect into your normal antenna system.
- It had an ugly tuning knob—a trip to Radio Shack fixed this.
- I added the "enhanced sensitivity option." I might want to re-think this. With it, the regeneration setting is somewhat "twitchy."
- Calibration required borrowing a signal generator from a friend. I have to consult a chart for the specific frequency of interest. I simply stuck a chart with the tuning ranges to the top of the receiver.

The second regenerative receiver kit I built was the MFJ-8100. They take a slightly different tack in the design. They use a series of inductors with a simple multi-position switch to tap into the inductor string for band switching.

MJF-8100 uses a nice variable capacitor with a vernier reduction drive for tuning. This "feels" better than the potentiometer used in the Ten-Tec 1253. The tuning is a little "fast" on the upper bands, but acceptable. I admit to being a traditionalist on the issue of real variable capacitors. I am not sure God intended us to tune circuits with varactors! The MFJ-8100 has five bands to cover most of the same range as the Ten-Tec 1253. This is due to using a variable capacitor instead of a varactor.

The detector circuit of the MFJ-8100 appears to be essentially the same as the Ten-Tec 1253. The difficulties with the MFJ-8100 are:

- Again, a lack of a shielded antenna connection. I added an SO-239 connector on the back panel.
- Lack of an external power supply connection. A power jack from Radio Shack and a SPDT toggle switch took care of this. I can use an external 9-volt battery. There are eight screws to remove to get the case apart to change the battery, so an external battery is handy.
- Exact calibration can effectively be done only at one point. I zero beat to WWV at 15 MHz. At worst, the dial seems to be off by +/- 200 kHz at the lowest or highest tunable frequencies. I made a couple of dots for the CW portions of the 40- and 20-meter bands for CW QRP monitoring.
- Headphone-only operation. A small external speaker amplifier from Radio Shack took care of this.
- The RF gain control is internal. However, I find that with either the Ten-Tec 1253 and MFJ-8100 that I rarely have to adjust the RF gain control unless I have a very strong station.

Both receivers are sufficiently stable for CW and SSB reception.

I have found that external battery operation (12-volt gel cell for Ten-Tec 1253 and 9-volt battery for MFJ-8100) is the best bet. The usual "wall wart" or converted PC power supplies seem to generate too much hash at HF for good clean reception.

Both receivers benefit from the use of an antenna tuner to optimize the matching between the antenna and the receiver input impedance.

For further reading and study, Google is your friend. A very good discussion of regenerative receivers can be found in the paper by Ramon Vargas at:

http://cidtel.inictel.gob.pe/cidtel/contenido/Publicaciones.php?autor=rvargas

The seminal article by Charles Kitchin is to be found in the November/December 1998 *QST*. He has an extensive discussion, and shows both photos and schematics of an excellent complete solid-state regenerative receiver.

Also, some very nice material on direct conversion and Wheatstone bridge regenerative receivers can be found at:

http://mjrainey.googlepages.com/radio

A good source of early books on vacuum tube receivers and the like can be found at:

http://www.pmillett.com/tecnical_books_online.htm

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Robert F. Heytow
Memorial Radio Club
www.k9ya.org
telegraph@k9ya.org
Volume 6, Issue 9

The Hollywood Connection

By Philip Cala-Lazar, K9PL

The "Amateur Radio STATIONS" column in the August 1937 issue of *QST* spotlights "W6CNE's Mobile Rig." Who was W6CNE? He was J. Roy Hunt (1884-1972), at the time, chief cinematographer at RKO. The article describes Hunt's "mobile rig," actually a complete station and recreational vehicle built into a panel truck. The whole shebang derived its 110-volts AC from a "gasoline-engine driven generator made by Kato" and mounted in front of the truck's radiator grille.

One of the photographs accompanying the article features Hunt and three 1930s celebrities: comedians Joe Penner and Parkyakarkas (Harry Parke) and actress Lorraine Krueger standing alongside Hunt's truck. In the photo the rubber-faced Penner is shown speaking into a microphone, probably spouting his signature, "Wanna buy a duck?"

This photo set me wondering, why these three performers? Checking J. Roy Hunt's filmography at the Internet Movie Database (**www.imdb.com**) soon revealed why: they were all cast members of the film *New Faces of 1937* and Hunt its cinematographer.

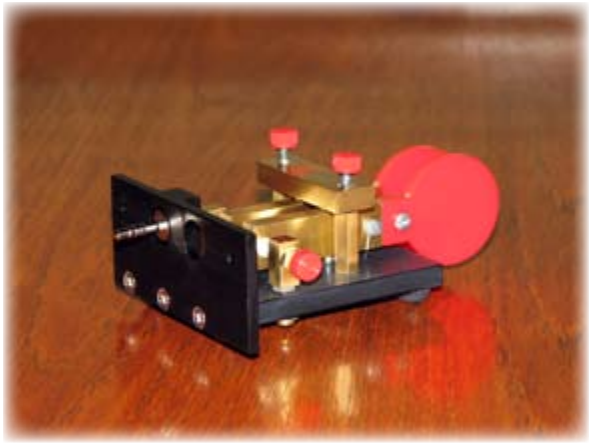
A few months ago I had the opportunity to view a late, late show airing of *New Faces of 1937* and if you have seen Mel Brook's 1968 film *The Producers*, you already know the basic plot of the earlier film.

So, we can conjecture, during a lull in filming Hunt invites some of the cast to check out his mobile station and pose for a few publicity shots. Amazing what a small photo in a 72-year-old magazine can reveal.

J. Roy Hunt's personal papers are held at the special collections department of the Margaret Herrick Library of the Academy of Motion Picture Arts and Sciences. The library's description of his papers includes this sentence, "Much of the material relates to his service during World War II and to his ham-radio station." ■

Continued - arachnid from Page 1

key jack and is secured to the rig enclosure with two red-capped socket screws. To use the paddle with other rigs and keyers requires a jumper with a miniature inline stereo jack at one end and a suitable plug to fit your gear at the other end. The Baby Black Widow is equipped with four rubber feet.



On the air?

In my experience, the Baby Black Widow effortlessly energizes the PFR-3's keyer as it clacks along at 30-wpm. The brass paddle arms' mass and rigidity pay dividends, as inputs are not dissipated and corrupted by any flexure. As I said about its predecessor in October 2006, it's a "…solid performer, good looker and enhances Morse prowess…" This time in a compact package.

(Full details at: **http://www.w5jh.net/BBW_PFR3.htm**)

Robert F. Heytow
Memorial Radio Club

www.k9ya.org
telegraph@k9ya.org