

Indiana Historical Radio Society  
**BULLETIN**

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**BULLETIN**

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The *Indiana Historical Radio Society* is a non-profit organization founded in 1971. Annual membership dues are \$10.00, which includes the quarterly *IHRS Bulletin*. Radioads are free to all members. Please include a S.A.S.E. when requesting information.

August 1, 1992

# IHRS



# Mid-Summer

# SWAP MEET

**Where:** Biddle Park, Sheridan, Indiana

**Time:** 8:00 am to 1:00 pm

**Cost:** \$3.00 contribution to the IHRS

**Bring:** Tables

- **NO:**

Business Meeting

Contest

Planned Meal (Bring a picnic or the DQ is across the road)

- **JUST:**

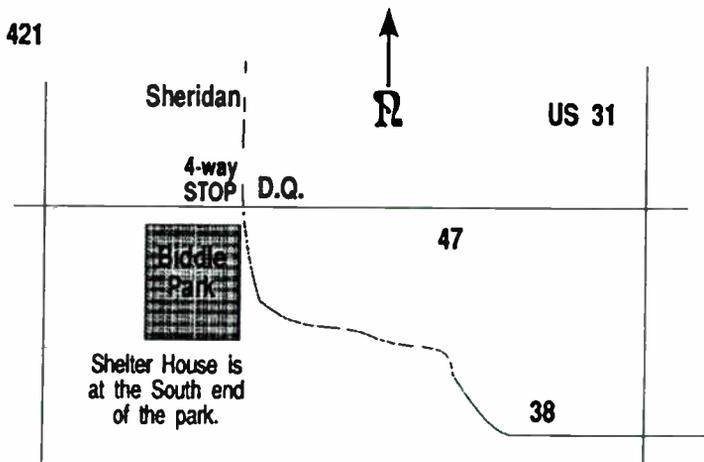
Visit

Swap

Shop

**HAVE FUN!!!!**

**Information:** Eric Sanders, (317) 758-4988





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# EDITOR'S COMMENTS

*Dear Membership:*

First, let me apologize for the late arrival of the summer *IHRS Bulletin*. My position with DELCO Electronics often takes me "on the road." The last month I have been out-of-town more than usual.

Secondly, let me thank all who have contributed material to the *Bulletin* lately. Everyone has probably notice the format changes this past year. The cover has taken on a new look with the addition of color. Thanks to Robert Boots of Ladoga, we have a more "polished" look. Bob has volunteered to be our page layout editor. His skill with, and access to a PC (as well as his typing skills), allows us to have a "slicker" look.

This *Bulletin* was made possible by the contributions of the following members:

**Don & Marilyn Johnson**  
**Ross Smith**

**Walt Sanders**

**Dr. Ed Taylor**  
**Glen Rogers**  
**Chester A. Gehman**  
**John S. Jones**  
**Robert F. Miller**

*Kokomo Meet*  
*Elkhart Meet/Plastic Cabinets/  
/Transistor Radio Collecting*  
*Rola Cone Re-creator/Auction Results/  
Radio Quiz*  
*Kokomo Contest/Have Your Read*  
*Harry Garba W9LBE*  
*An Unusual Problem*  
*From Head Phones to Cone Speakers*  
*American Bosch AMBOROLA 16*

I am desperate for material for the next *Bulletin*! Please send something!  
Deadline for material is **Labor Day (PLEASE!)**

Please attend the morning Summer Swap Meet in Sheridan August 1st.  
My home will be open for those wishing to visit immediately following the meet.

**THANKS, ERIC**

## *KOKOMO Contest Results*

Many unusual radio artifacts were on display in the Kokomo contest room. Thanks to all who entered equipment from their collections. The entries were judged by : Don Johnston, Robert Lozier, and Walt Sanders. The Blue Ribbon in *Class 1 -- Crystal Sets*, was won by Harry Blesy, with second place awarded to Bob Sands. The Blue Ribbon in *Class 2 -- Two Tube Radios*, was won by Peter Yanczer, with second place awarded to Harry Blesy. Both radios in this class were Philmores. The Blue Ribbon in *Class 3 -- Delco Table Models*, was won by Doug Houston with his beautiful R-1116, with second place awarded to Tom Williams with a 32 volt model. The Blue Ribbon for *Class 4 -- Amateur Communications*, was won by Ross Smith with his Silver Marshall "Round the World 4", with second place awarded to Glen Roger and his SW-3. The largest class was *Class 6 -- Novelty Transistors*, with the Blue Ribbon going to a display of Elvis an Lennon which was assembled by Janet LaVelle, with second place awarded to Robert Lozier with several unusual Italian advertising radios. The Blue Ribbon for *Class 7 -- Radio Paper* was won by George Freeman, with second place awarded to Jay Volke for his enlarged photos of the Delco radio assembly plant.

The *Ron Scranton Memorial Grebe Trophy*, for the best of show, was awarded to George Freeman for his beautiful display of historic radio artifacts which he has assembled under the title of The WGRP/WKRC Story -- Congratulations George! It is hoped that all members had an opportunity to see the outstanding entry.

*Dr. Ed Taylor*  
*Contest Chairman*

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### **RADIO QUIZ:**

1. Who was Almeda Fowler?
2. Where was the first radiophone used commercially?

# IHRS/AWA SPRING MEET

April 30, May 1 and 2, 1992  
Kokomo, Indiana

The "kickoff" was Wednesday evening when we had guests from twelve states at our Open House (and we were afraid no one would come!) Some wives promised never to complain again about how much space their husband's radios took up, after seeing Don's "tip of the iceberg" collections. Of course, you must remember his hobby is hobbies, not just radios and wireless.

There were early birds -- the Flea Market started before Thursday. And it grew out of the Ramada designated parking area and into the grass. We did hear feedback that the grass was better than the parking lot.

The two tours of Delco Electronics' Fab III building were enlightening and filled to capacity on Thursday afternoon. Fab III is a high-technology, high volume IC manufacturing Wafer Fabrication Facility. These ICs make GM cars safer, more fuel efficient and cleaner operating.

All of the air in the cleanroom is circulated through HEPA filters 8 1/2 times/minute. These filters are 99.97% efficient on particles that are 0.3 micrometer in diameter!

Peter Yanczer and John Jones provided the Laurel and Hardy movies on Thursday evening. Hot buttered popcorn was served by Edna Yanczer. IHRS supplied four flavors of soft drinks for the 3-day meeting.

Ross Smith's Restoration Clinic was well-attended on Friday morning; he shared tips from the Northern Indiana News Letter. Robert Miller assisted with restoration information on small battery eliminators for his Crosley Trirdyn, which was a very critical circuit to restore.

Twenty-two attended IHRS' First Ladies Luncheon (patterned after MARC's and AWA's). Louise Linn gave an hour program on History of Lace. It was a privilege and a hands on treat to hear Louise speak, without notes, but with a dozen examples of museum quality lace from around the world; some were hundreds of years old!

After an Attitude Retuning social hour, a Buffet Dinner was well-attended and enjoyed. John Coleman, General Manager WIOU/WZWZ Radio Station, spoke on his memories of 30 Years in Radio Broadcasting.



The contest awards were announced by Dr. E.E. Taylor, Chairman of the judging (See contest information on page 4). Auction entries started arriving before 7 a.m., Saturday; 240 items plus donated items -- with 71 bidders. The auction ran four hours. Steve Waldron conducted the auction assisted by Harry Blessy, who is a special worker in the Indiana, Michigan, and Illinois radio clubs. There were few minimum bids; only two buy-backs (by the same seller). See the auction results on page 8 for additional information.

Total attenders is undetermined; 163 families registrations with 1, 2, 3, 4, or 5 members. The number of dealers in the Flea Market is unknown.

In retrospect, the meeting was a success. IHRS gained new members and balanced in the black, we saw old friends, had a memorable three days, and we survived. To all who volunteered to serve, and there were many, and to the ones who were drafted -- **THANKS!**

*Committee:* Carl and Nadine Bryant; Glenn Fitch; James Fred; Terry Garl; Shirley Hauske; John Jones; Louis Linn; Robert Lozier, Jr.; Robert Miller; Eric, Glenna, and Walter Sanders; Sue Sands; Ross Smith; Dr. E.E. Taylor; James Thomas; Edna and Peter Yanczer; Herman Zaps (sorry if we overlooked anyone).

We thank you for permitted us to Chair your Spring Meet. It was wonderful to hear and receive the kind words of praise in your notes, telephone calls and in person. We did our best to please you. We will be available to assist, but we cannot Chair the 1993 meet. Thanks for the compliments.

*Don and Marilyn Johnston, Co-Chair*  
May, 1992



## Kokomo Auction Results

Playing Philco PT25	27.50
Playing Delco 1235	22.50
Splitdorf R500, 3 Dialer	47.50 NO TUBES
Playing Radiola 26	290.00
2 each X-299 & 1 VV-199	30.00 GOOD FILAMENT
Non-working AK 40	27.50 NO TUBES
Nice restored Philco 60	110.00
Box of transistor radios & 25 Magazines	12.50
2 each new IL6 tubes	9.00
5 each Arcturus Blue #27 Tubes	27.50
Delco Tombstone	55.00
Tube caddy with 100 tubes	35.00
Large Zenith Sign	20.00
Supreme 400 Tube Tester	17.50
Box of Radio News (1932-43)	30.00
2 each box of QST	40.00 EACH
Champion Spark Plug Radio	50.00
RCA III	45.00 NO TUBES
Westinghouse RC	95.00 NO TUBES
RCA UZ 1325 Horn	35.00
Jewett Horn	55.00
2 each Magnavox R-3	1 @ 65; 1 @ 102.50
Home Brew Crystal Set	17.50
Dumont Neon Sign	75.00
Box of Car Radios	25.00
Box of Many Tubes	From 5 - 47.50
AK44 with Thorloa Jr. Horn	65.00
Neodyne	40.00
Apex Console	40.00
Crosley Tridyne	42.50
Zenith Transoceanic	40.00
Home Brew with 5 good O1A Tubes	50.00
Radiola 33	22.50
Crosley 5-38 with tubes	45.00
Freshman Masterpiece with tubes	35.00
Splitdorf V-695 & 6 good tubes	55.00
Graybar 310	60.00
Radiola 20	55.00
Zenith 11-E	50.00
Philco 511	30.00
AK 55	40.00
Victor R52	45.00
Silver Marshall 1680 Console	150.00
Sparton AC-62	17.50

## IHRS Summer Meet Held In Elkhart

The High-Dive Park in Elkhart, with paths and foot bridges over the river leading to two other parks, was an ideal setting for our summer meet on Saturday, June 27th. The weather cooperated for a beautiful mild day.

There was adequate parking for the Swap Meet and a wide variety of items for sale. Members and guests came from as far as Canada, Illinois, Michigan, Ohio and southern Indiana.

Our committee, headed by Co-chairmen Doug McIntosh and Terry Garl did a great job in keeping the program going during the day. The Ladies did a fine job in the kitchen organizing a delicious carry-in dinner.

The star of the show was Hal Hunt's Capehart AM-FM Radio-phono Console with the famous Capehart record changer that flips the records over, playing both sides, an incredible machine!

Ty Gregory conducted our first "Silent Auction" with 10% of the sales going to the IHRS. The peoples choice contest attracted several rare pieces that are seldom seen. Contest winners were:

**1920 RADIOS:** First -- Don Myers with a Diamond "T" made in South Bend, Indiana. Second -- Charles Miller with a Grebe MU-1.

**1930 RADIOS:** First -- Ross Smith with a 1939 RCA New York World's Fair Radio featuring the Trylon-Perisphere on the front panel. Second - - John Kellar with a Colonial Black Beauty with chrome trim.

**1940 RADIOS:** First -- Mike Serafeno with a beautiful Addison multi-color Catalin. Second -- Hal Hunt with his Capehart Console.

**UGLIEST RADIO:** First -- John Kellar with a odd-looking Sylvania Blond Wood table model. Second -- Charles Miller with a Philco "Rino-Skin" portable.

*R.S.*

# *Rola Cone*

## Re-creator

*by Walt Sanders*

Why does a speaker sound better and louder in a cabinet than when removed from the cabinet? The cabinet not only acts as a sound chamber, but also reflects the sound waves out from the convex side of the cone.

By 1925, speaker manufacturers had discovered that placing a wooden ring about two or three inches wide around the convex side of the cone effectively maximizes the volume of the speaker. When a speaker is mounted in a cabinet, the speaker is mounted to a board which is then mounted to the front of the enclosure, thus forming a baffle board for the speaker.

The Roloa Cone Re-Creator pictured (The Rola Company, Oakland, California) is an early example of a cone speaker with a baffle plate. The cone is eight inches in diameter, and the baffle is three and one half inches wide ring, fifteen and one half inches in diameter. The driver is of the semi-balanced armature type. The cone is fully protected by a slotted metal cone in back and a cloth covered wire mesh in front.



# Cleaning and Polishing Plastic Cabinets

## *IHRS Northern Indiana Members*

*Edited by Ross Smith*

Doug McIntosh: On a trip to Arkansas I purchased a Farnsworth Model G.T.050 brown bakelite radio. Being produced in Indiana, the radio desires an extra fine shine. First, you must use a lot of elbow grease, the more the better, and at least five coats of Semichrome Polish followed by several coats of New Finish Automotive Polish. This should remove most of the oxidation that has built up over the years and leave a beautiful shine.

Terry Garl: Clean and polish your radio cabinet just as you would clean and polish your car. Remove dirt and oxidation with DuPont #7 White Polishing Compound and wax with a good grade hard finish automobile wax.

CAUTIONS: Do not use chemicals such as acetone or laquer thinner for cleaning. They will act as strippers on paint surfaces and may etch the plastic or bakelite surface. Do not use ammonia as it may change the color. Read the labels of detergents such as Fantastic, Top Job, etc. before using. If a degreaser is needed, use lighter fluid on a soft cotton rag. It will not harm paint, decals or labels. REMOVE RADIO FROM CABINET so that the inside can also be cleaned. You may use mild dishwashing liquid (not automatic dishwasher powder). If a mild soap does not do the job and a stronger soap is needed, try Top Job detergent cut with 50% water by volume. Rinse in hot water immediately and dry.

Ross Smith: One method that has worked best for me on Nylon (non-breakable transistor cases) has been to place Plastic Polish from Antique Electronic Supply on a soft cotton cloth, then dip the wet spot into dry powdered silver polish and rub vigorously. The silver polish has just enough polishing action to bring out a bright shine on Nylon surfaces.

Norm Smith of Bradenton, Florida uses Lemon Pledge and a soft tooth brush to clean his numerous transistor sets. Norm has one of the largest collections of transistor sets in the country.

FOR DIFFICULT CASES where poor surfaces will not polish, use a filler such as Armorall or a light spray coat of Acrylic Clear Varnish. This will enhance the color and bring back the shine for sure!. Surfaces must be thoroughly cleaned and degreased before using the filler.

FOR CLEANING CATALIN: Ed Lyon has a kit of materials with instructions on how to bring back the original color of Catalin, available for about \$15. Contact Ed Lyon, 11301 Woodland Way, Myersville, MD 21773.

73.

## *Transistor Radio Collecting*

More and more collectors are jumping inot the hobby of collecting transistor radios. There are quite a few around yet and are relatively low in price. It takes much less space to display them and some are very colorful. My friend Norman Smith is probably the largest collector in the country, having several hundred. The first edition U.S. made sets are the ones most searched for. As a guide, the following models are the first issue in the 1950's. If you know of others, please contact the editor so that we can add them.

MAKE & MODEL	DESCRIPTION	DATE OF ISSUE
<i>Regency TR-1</i>	4-transistor, pocket size, 3" X 5" X 1 3/4". The first one	Oct. 1954
<i>Raytheon T-100</i>	4-transistor, small, 6 1/4" X 3 1/2" X 1 3/4"	1955
<i>Zenith Royal 500</i>	Hand wired chassis 7XT40 5 3/4" X 3 1/2" X 1 1/2"	Nov. 1955
<i>RCA 7BT-9J</i>	6-transistor small size	1955
<i>G.E. 675</i>	5-transistor, small size 5 1/2" X 3" X 1 3/8"	1955
<i>Motorola 36T-1</i>	5-transistor, small size portable	1955
<i>Philco T7</i>	7-transistor, small size	1956
<i>Arvin 8576 and Silvertone 8240</i>	5-transistor, small size	1956
<i>Magnavox AM-2</i>	6-transistor, small size	1956
<i>Heath Kit XR-1</i>	6-transistor, large portable with 4" X 6" speaker	1958
<i>Zenith Royal 1000</i>	9-transistor large portable, first Transoceanic	1959

More of the above information courtesy of IHRS member Bill Morris of Carmel. Thanks very much, Bill. Do you have more?

**OHIO -- Sunday, August 2, 1992**

*Ohio Area Radio Collectors  
Mid-Summer Meet*

**FREE ADMISSION  
FREE SETUP  
WE WELCOME EVERYONE**

Dayton, Ohio -- Moraine Civic Center  
3050 Kreitzer  
I-75 Exit #50A, Moraine/Dryden Road  
Follow Signs  
Information: WQRP FM 88 (513) 298-4044  
Harold Parshall (513) 268-2909  
Jim Di Ruzza (513) 233-5004

**NOTE: We are not associated with any other Radio Club.  
Co-sponsored by WQRP FM 88**

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## **IHRS Members Honored by AWA**

The following members of the IHRS who were authors of Volume 32 of the *AWA Old Timer's Bulletin* were listed on page 21 of the *OTB* Volume 33, Number 1. Serge Krauss, Dr. Ed Taylor, Rodney Schrock KD3OR, Ross Smith and George Hauske W9OLE (Volume 33).



# Sound Reproducers: From Headphones to Cone Speakers

Submitted by John S. Jones

Now in order to reproduce at the receiver the audible sounds which were impressed on the carrier wave at the transmitter, we must use headphones or loudspeakers. Radio headphones operate on the same general principle as a telephone receiver, and by means of magnetic action on a diaphragm convert the electrical impulses from the amplifier output back into air waves or audible sound. Ear phones for use with radio receivers are generally made in pairs and fastened together with a head band. The two units are connected in series and equipped with a cord with metal tips or plugs for convenient connection to the set.

Ear phones for radio use are made in thin flat units like a telephone operator's head set, and are made as light in weight as possible for comfort to radio operators or testers who may wear them for long periods. The coils of the electro-magnets in these phones are usually wound with several thousand turns of

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## Radio and Television Pioneers: A Patent Bibliography

by David W. Kraeuter  
Scarecrow Press, Inc.  
P.O. Box 4167  
Metuchen, NJ 08840, 1-800-537-7107  
329 pp, 1992 92-8879  
ISBN 0-8108-2556-2 \$35.00

Each of the U.S. patents of forty radio and television inventors is cited in chronological order, giving the researcher a sense of overall development of each inventor's work. Great or lesser patents are listed, including Lee de Forests Audion (the radio tube) and transistor; Edwin Armstrong's wide-band FM and super-heterodyne circuits; David Sarnoff's secret radio signaling system; William Dubilier's electrical condensers, along with his better mousetrap; and John Stone's many important radio telegraphy and telephony devices, plus his reinforced soap cake.

Included also are complete citations to over 3,000 patents granted to Alexander, the Bairds, Carson, Colpitts, Conrad, Davis, Dolbear,

DuMont, Farnsworth, Fessenden, Fleming, Gernsback, Goldsmith, Hazeltine, Hogan, Houck, Jenkins, Kent, Kintner, Kolster, Loomis, Marconi, Maxim, Miessner, Margas, Pickard, Pupin, Rider, Silver, Stubblefield, Tarzian, Tuska, Victoreen, and Zworykin. Coverage is from the beginning of radio in the nineteenth century through 1978.

With a title index for each inventor with ten or more patents, a cumulative personal name index to locate patents granted in the name of more than one person, and a list of U.S. Patent Depository Libraries.

This book will be useful to anyone studying the technical or commercial history of radio and television, particularly as it developed in the United States.

David W. Kraeuter (BA, Geneva College; MLS, Pittsburgh) is a reference librarian at Washington and Jefferson College, Washington, PA. His articles on radios and radio history have appeared in various popular and technical journals, and he edits *The Pittsburgh Oscillator: The Journal of the Pittsburgh Antique Radio Society*.

very fine enameled copper wire and good headphone sets have a resistance of 2,000 to 5,000 ohms. The amount of current supplied by radio receivers is very small, so the phone magnets should have a great number of turns to give them as many ampere turns magnetic strength as possible with the small currents which operate them. It is also desirable to use phones with large numbers of turns on their coils when the phones are to be used with vacuum tube receivers, because if the impedance of the phones is about the same as that of the tube plate circuit, best results will be obtained from the tube.

Most earphones have a ring shaped or horseshoe shaped permanent magnet in the case, and the coils of the electro-magnets are usually placed over the ends or poles of these permanent magnets, as shown in Fig. 23-10. In this sketch a sectional view of the ring shaped permanent magnet is shown at *P*, with the pole pieces *N* and *S* attached. The coils *C* are placed over these pole pieces as shown. When no current is flowing through the coils, the permanent magnet poles hold the thin iron diaphragm slightly attracted as at *D*. When current is passed through the electro-magnet coils it sets up flux and polarity which either aids or opposes that of the permanent magnets, according to the direction of current flow. If this current is either a-c or pulsating d-c it will cause the diaphragm to vibrate and produce sound waves.

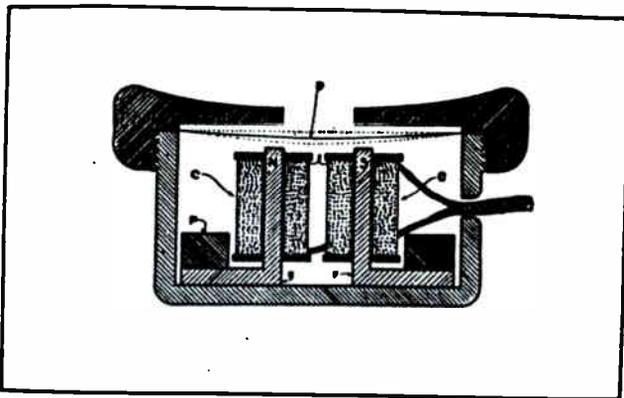


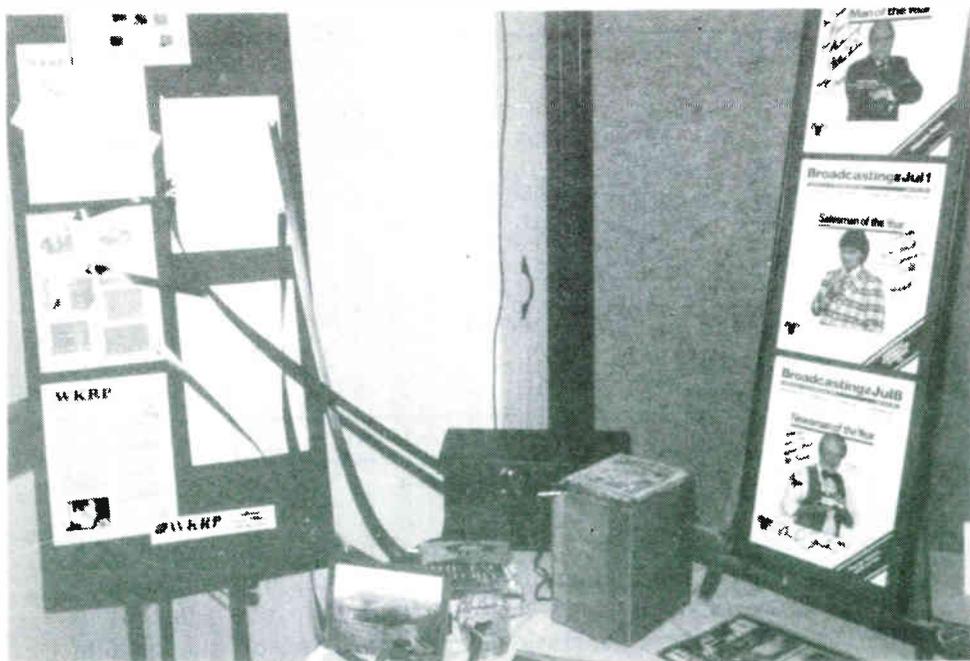
Fig. 23-10.—Sectional sketch showing the construction and operation of the carphone unit. Note the arrangement of the permanent magnet and the electro-magnet coils.

When a pair of phones is connected in the plate circuit of a vacuum tube, a small amount of current (the normal plate current) flows through them all the time the tube filament is lighted. When signal variations are impressed on the grid of

the tube the plate current pulsates or decreases and increases and the pulsating d-c causes the phone diaphragms to vibrate as shown by the dotted lines in Fig. 23-10 and thus reproduce the sound. When a loudspeaker or phones are connected to the secondary of an output transformer, instead of directly in the plate circuit, the current flowing through them will be alternating, but will also vary in value with the signal variations, so the phone or speaker diaphragm will still vibrate and reproduce the sound.

When handling headphones, care should be taken not to allow the diaphragms to become permanently bent or loose. Sometimes a piece of dirt or magnetic material will become lodged between one of the magnet poles and the diaphragm and will interfere with the operation of the phone. The cap can be unscrewed, the diaphragm carefully removed and the dirt cleaned out.

Great care should be used in cleaning or working around the coils, as their wires and connections are so fine that they are easily broken. Headphones can be quickly and easily tested for open circuits by connecting them directly across a 1½-volt dry cell. If the circuit is complete, a click should be heard in the phones when the connection to the cell is made and broken. Headphones are very useful with small low power receivers, for receiving very weak signals from distant stations and also for testing receivers.



# Restoration:

## *American Bosch. AMBOROLA 16*

The Amborola 16 is an interesting 1925 battery radio, shown in *Figures 1* and *2*. Compensation for TRF loss of gain at low frequencies is done automatically by rotating a potentiometer arm along with the tuning capacitors to vary the r-f bias. Amperites are used for filament control instead of rheostats, except for the output stage. Audio gain is provided by three stages: transformer coupling to the first stage, then resistance coupling to the second and third stages. The set is housed in a beautiful curly maple cabinet.

The set had been worked on before. The Jefferson a-f transformer is evidently a replacement. The Amperite ballasts have been resoldered to their ferrules. More soldering was required, suggesting a need for a higher temperature solder. One Amperite element was burned out. It was shunted with a resistor to bring it in line with the other Amperites at a 5-volt filament voltage (approximated 3 ohms). Since Amperites do not perform as advertised (e.g. QST, Fed. 1925, p. 65), avoid applying too much voltage the 210A's by the combination of supply voltage and connecting lead resistance.

The most serious problem with this Amborola was the broken gain-compensating potentiometer which is rotated with the tuning. The tedious repair of this resistance can be avoided by disconnecting the bias to the r-f stages from its arm and connecting it directly to the arm of one of the chassis potentiometers to which the ends of the rotated potentiometer were connected. Set it so that oscillation does not occur at any frequency. If desired, it can be readjusted on occasion to favor the less sensitive end of the dial. For the diehard, I would be happy to share how the full repair was done.

The a-f resistors and grid lead had increased thus:

Rp of 1 a-f from 0.1M to 0.6M  
Rg of 2 a-f from 0.5M to 0.7M  
Rp of 2 a-f from 0.05M to 0.6M  
Rg of 3 a-f from 0.25M to 0.4M  
Rg of Det from 3.M to 1000+M

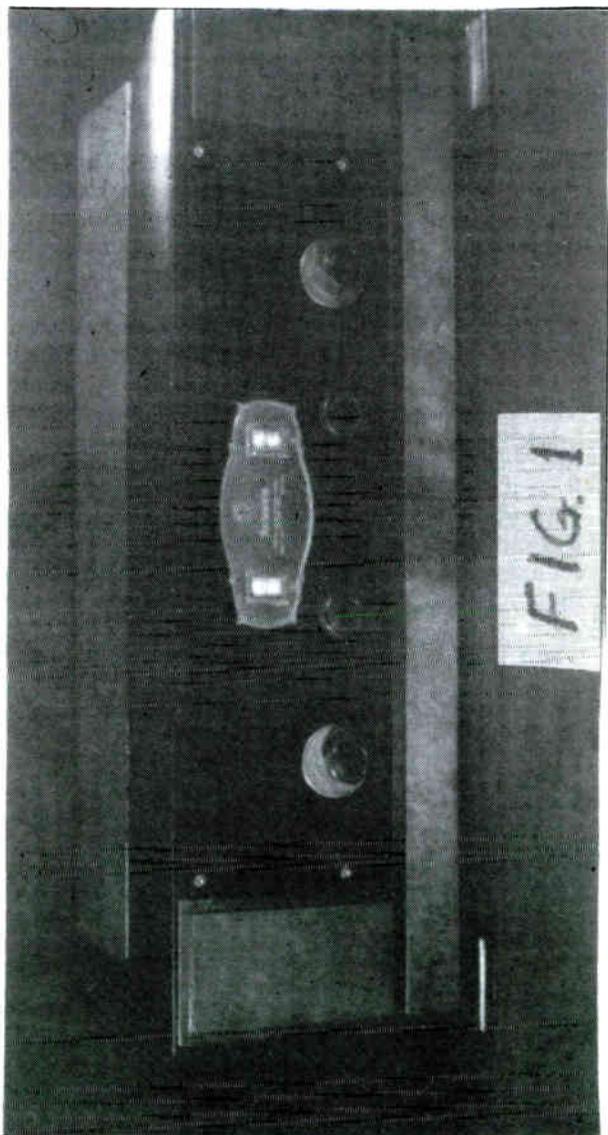
Shunting the plate resistors to bring them within reason can be done below the chassis. The original snap-in resistors were left for appearance sake. The grid resistors are not critical, but the detector gridleak was replaced.

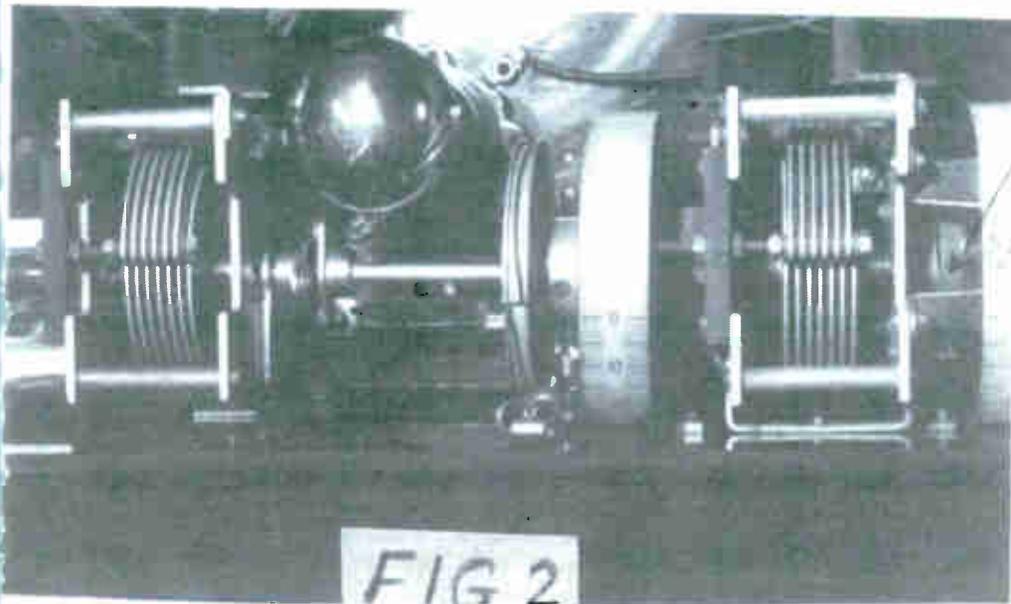
The filament switch had worn to such a floppy condition that its noisiness could not be eliminated, so it was soldered out of the circuit. It is not needed now when an a-c power supply is used. Strangely it had a position to cut off the first r-f filament without moving the antenna to the next stage.

Dial cord slippage was reduced by adding a second spring. Slight pressure on the panel during tuning caused crackling noise which was caused by a broken solder joint on the busbar leading from the detector tuning capacitor to the grid capacitor. The busbar was replaced with a flexible wire to forestall recurrence of this problem. The sagging coils were propped up with blocks of dielectric material.

This Ammorola works quite well with good sensitivity and selectivity. Quality and volume are very good with the 71A in the output stage, Ep 135, Ip 8 ma, det 22 volts, r-f 67 volts, 10/2 ma.

*Robert F. Miller*





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## Radio Repair

*"Who knows what evil lurks in the hearts of all men? The Shadow knows!"* Old radio shows are again playing on the air, capturing the ears and imaginations of a generation that has never heard of a cat's whisker tuner or a carbon arc transmitter! Now, what could be better than listening to these great moments from the Golden Age of Radio on an antique radio you've restored yourself?

**RADIO** is a preliminary course on "How to service and restore antique radios." Fixing up old radios can be a reward hobby, particularly as antique radios have become collectors items! The quintessence of nostalgia, many of these old radios are lying around in attics and at junk shops -- waiting for someone to see past the dust and bring them back to life!

This how-to booklet on computer disc reveals the simple test equipment you will need and guides you step-by-step, through the process of checking and repairing each component of an antique radio to restore it to top-notch condition. A vacuum tube guide is provided, as well as the RMA color code for power transformers, audio-frequency transformers, intermediate-frequency transformers, and speaker field coils. (PC-SIG Disk #1432)  
**Special Requirements:** Word Processor or Text Editor needed to read file on a PC.

**Author Registration:** \$5.00

*For more information contact George Clemens.*

# An Unusual, Problem

by:

Chester A. Gehman  
150 Burwell Road, R. 2  
Winsted, CT 06098

Those of you who serviced radios back in the '30s will probably recall that not all troubles encountered were solved by the new replacement of defective components. While the symptoms were reflected in electrical form, the source was sometimes traced to a mechanical malfunction. Today as we attempt to repair, rejuvenate or even reincarnate some of those magnificent antiques, history repeats itself. There comes to my mind the wave-band switch adventure with Don Johnston's McMurdo-Silver Masterpiece III. (But that's another story -- I'll let Don Tel about that.)

As a favor, I recently agreed to see if an old Wurlitzer receiver was restorable. I found several "close" schematics, but exact match for this set which used 24s, 27s, and ONE 57. I knew the company had been a source of "bargain" radios sold under many flags to furniture and department stores, so I wasn't surprised. As it turned out, a schematic would have been of little help in this case.

The replacement of filters, couplers, by-passes, several tired resistors and a line cord brought forth music on the BC band. A touch up of the alignment helped, but with borderline tubes the sensitivity was only fair. The receiver had three SW bands; Band II picked up the high end of the BC band rather weakly, but not much more. Band III produced a few very weak signals; Band IV was dead. With no RF stage, the trouble had to be in the mixer. (Yes, Virginia -- *this was a superhet*). As suspected, the oscillator grid-voltage when monitored dropped from a low, but workable, value on Band I down to zero on Band IV. A new '57 didn't help; neither did increasing the osc plate voltage to 150 v. -- nor replacing the mica grid-coupling capacitor. Suspect: the tapped osc coil, or the band switch (which I eliminated by disconnecting.) Unfortunately, I no longer own a Q-meter, but by connecting a "good" variable capacitor the rascal oscillated like a scared rabbit. *TUNING CAPACITOR* trouble?

Earlier I have noticed -- and cleaned -- corrosion from the top of the unit; now it received further attention. For years the

stator sections on moderately priced variables were held in position by one screw top-side and one bottom side. Woe be unto the unwary who loosens side screws with proper precaution. I remembered to insert thick paper spacers between the fixed and variable plates before removing the top screw and cleaning it. (WHY did they use steel screws instead of brass???) VOILA!!! Screw replaced and tightened brought an increase of about one volt in the BC osc voltage, but negligible improvement elsewhere. By now the stubborn Dutchman in me took over; I wasn't about to give up. Here's where a pictorial wiring diagram would have been helpful. While a schematic would usually not have shown it, tracing the siring disclosed a second stator connection at the **BOTTOM** of the variable where additional rust and corrosion were visible -- but inaccessible. (I drew the line at trying to remove the tuning assembly!) For kicks I measure the resistance from top to bottom of the stator: 7 ohms using an analog meter, 11 ohms on a digital -- this instead of an almost zero reading one would expect. No wonder the oscillator suffered from anemia. Be aware that RF loss associated with oxidation varies approximately as the square of frequency. While the top terminal was connected to the osc coil via a hole in the shield can, the bottom wire disappeared into the band switch and eventually headed for the osc grid. I didn't bother to trace out the complete oscillator circuit -- some of those oldies were weird to say the least. I slipped the bottom wire as close as possible to the trouble and re-routed it to the top connection. A few minutes later London was "calling" on 21MHz.

In retrospect I can recall several other radios with similar symptoms where the problem was shelved -- blamed on "old age". Perhaps they too could have been rejuvenated. So, if you find an oscillator that gets tired at high frequencies, look to the **BOTTOM** connection of the old tuning condenser.

*Chester A. Gehman,*  
150 Burwell Road, R.R. #2  
Winsted, CT 06098

## Our Parts Are Better:

Near Akron, Ohio, ca 1930, there was a radio parts store (Kladag Radio Labs, Kent, Ohio) over a grocery store. Customers entered from the rear, up a stairway whose riser carrier these slogans:

"If its radio and good, we have it!"

"Hopeful is the Bud who holds a 5 and 10 cent store condenser to his ear and turns the plates."

"KFI is sure audio bull on most sets."

As a teenage, I believed their claim of superior performance. I purchased a \$14 Hammarlund 4-gang condenser from them. It was to replace two 2-gang Pilot condensers which had cost a total of \$4. The radio worked no better with these "superior" condensers. And to make matters worse, after about five years the post metal mounting of the rotors had expanded so that the outer plates were rubbing the stator plates.

The dealer said he couldn't guarantee it for that long. I told him that I had put the Pilot condensers from the 5 and 10 cent store (hopeful is the Bud, etc.) back in the set and it now worked find. I suggested that he should change his slogans. But he didn't seem to be embarrassed. After all I was only a youngster who had come there on my bicycle. In fact I recently (1988) built one of these 2-ganger Pilots into a functioning inverse duplex receiver with all 1920's parts -- 60+ years old! If one is terribly careless and bends the plates of a Pilot condenser, they can be bent back, but pot metal -- *NO WAY!*

*Robert F. Miller*

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*Unique devices... fun for everyone.*



### SPARTON BLUEBIRD Art Deco Antique Radio

*The beautiful blue mirrors reflect the style of another time.*

*This AM/FM radio is a true replica of a 1930s piece.*

A circle of rich midnight blue mirror slants at an artistically correct angle, concealing a dependable AM/FM radio in a wooden box. Illuminated dial, elegantly trimmed in chrome.

Radio — Sony components & improved circuitry for clear AM/FM reception

Powerful 'Golden Voice' 4" speaker (4 Ohm)

Rotary volume control with ON/OFF switch

Rotary AM/FM control, output power 800mW

Operates on 120V/60Hz. Dimensions: 15" W x 15" H x 8" deep

*Truly a collector's item, the conversation piece adds a touch of class in any home or office.*

Item #38901

**\$149<sup>95</sup>**

# Restoration Tips:

Are you having trouble in replacing broken or worn drive belts for dial drivers such as Zenith and others used in the mid-1930's? There are a few new original replacements around, but is getting more difficult to find the correct length that you need. Here are a few alternatives:

1. Tie two or three turns of medium weight non-stretching cotton string around the pulleys. Tie each turn individually with a square knot as tightly as possible. Soak the string with a non-slip solution and allow to dry.

**NOTE:** Tension springs cannot be used on the pulley type dial drivers because they would circle the pulleys several times from one end of the dial to the other.

2. *O-Rings:* Most of the larger hardware stores and industrial supply houses have small diameter O-Rings that are long enough to stretch around the two pulleys. On with flat surfaces pulleys that have edge rims to keep the belt on the pulley, you may be able to use two O-Rings. The advantage is that they will stretch to the length you need and remain under tension.

3. *Urethane Belting:* The following article appears in Volume 7, No. 4, December 1978 of the IHRS Bulletin, and is written by Del Barrett of Ft. Wayne. "In restoring Black Dial Zenith AC receivers, there is usually a problem with the rubber belt on the tuner and flywheel. I use urethane belting as a replacement for the rubber belt. It is sold in a variety of shapes and sizes (round, flat, thick or thin), and is priced by the foot. All you need do is cut it to length, heat with a match or a hot knife blade so both ends melt, and then hold the ends together until they cool.

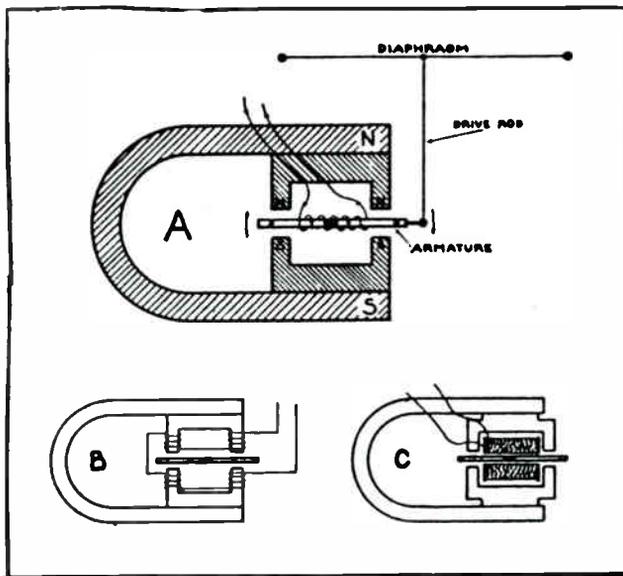
For correcting slippage on any belt, use Radio Shack "Non-Slip" solution, their catalog number 44-1013. Use a cotton swab applicator to apply Non-Slip to pulley drive surfaces and to working surfaces of the belt. Do not turn until dry.

## Sound Reproducers from Headphones to Cone Speakers Continued

A loud speaker is a reproducing unit which usually has a larger diaphragm than headphones have. One type of loud speaker reproducing unit known as the balanced armature type, is shown in the larger sketch in Fig. 23-11. In this type of unit a large horseshoe permanent magnet is used to provide a field in which a small balanced iron armature moves. This armature is pivoted at its center and has a thin rod or stiff wire connecting its end to the diaphragm. The movable armature has a small lightweight coil wound on it, or in some cases around it in solenoid form, but not touching it. In either case this coil is connected to the radio receiver output and when current flows through it in the direction indicated by the arrows, it creates *N* and *S* magnetic poles in the armature as shown, causing its right end to swing down and its left end up, because of the attraction and repulsion of the poles of the horseshoe magnet. If pulsating d-c or a-c is passed through this armature coil, it will rapidly change the magnetic strength of the armature and cause the armature and diaphragm to vibrate.

In another unit of very similar design the coils are wound on the pole tips of the permanent magnet as shown in the small sketch at *B* in Fig. 23-11. Pulsating current through these coils causes certain poles to be strengthened and others to be weakened, and the shifting flux causes the armature coil to be vibrated as before.

Fig. 23-11. -- These sketches show the construction of the loudspeaker driving units or reproducers of the balanced armature type.



Another type of speaker unit operating on this principle, constructed as shown at C in Fig. 23-11, uses a stationary solenoid coil to induce the magnetic polarity in the iron armature. This relieves the armature of all unnecessary weight and eliminates the necessity of having a moving coil, with its possibility of breaking the flexible connections, etc.

The diaphragm used with speaker units of this type do not need to be metal as there is no direct magnetic pull on them so they are generally made of non-magnetic materials.

In one type of speaker called the cone type, the driving rod of the speaker unit is connected to the center of a large cone instead of to a small flat diaphragm. These cones are made of paper, fibre, treated cloth, etc.

Cone speakers are capable of moving large volumes of air and of producing great sound volume with very good tone quality. They reproduce the low frequency bass notes of music much better than the small horn speakers.

**Dynamic Speakers.**—One of the best and most popular types of loudspeakers is the dynamic speaker which is used on the great majority of modern radio receivers. Fig. 23-12 is a sketch illustrating the construction and operation of this type of speaker.

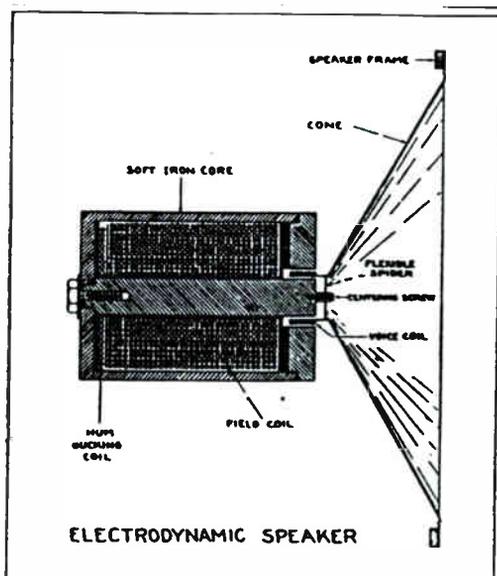


Fig. 23-12. -- This sketch show the construction of a dynamic speaker. Note the large field coil, small voice coil, the core, cone, etc.

## **Sound Reproducers from Headphones to Cone Speakers Continued**

The unit consists essentially of a powerful electromagnet for producing a magnetic field, and a small cone coil or "voice coil" attached to the apex or point of a stiff paper cone. The electromagnet or field magnet is wound with a great number of turns of wire around a heavy iron core. When the unit is in operation the coil of this magnet is excited by d-c, either from the power supply unit of the receiver or from a separate rectifier. This direct current sets up a powerful magnetic field around the end of the iron core, and across the turns of the small movable cone coil. Dynamic speaker fields operate on d-c voltages ranging from 6 volts on auto radios to 250 volts on a-c receivers for home use.

When pulsating or alternating current from the receiver output is passed through the cone coil, the reaction between the flux of its turns and that of the field magnet exerts a varying force to vibrate the small coil. As this coil is attached to the cone it causes the cone to vibrate also. The edge of the cone is cemented to a soft flexible leather or buckskin ring or edging, which in turn is fastened to the frame ring of the unit. The cones are often ribbed or corrugated.

The large coil of a dynamic speaker not only serves as field coil, but also acts as a very effective filter choke to smooth out the ripple in the d-c from the rectifier. When these units are built into a radio receiver, this coil often serves as one of the choke coils in the power pack filter. When used with a separate rectifier of its own, the speaker is equipped with filter condensers connected across its own field coil to filter out the pulsations of the rectified d-c. Fig. 23-13 shows a dynamic speaker with its field coil connected in series with the B-return lead of the power unit and serving as one of the filter chokes. The voice coil or cone coil is connected to the secondary of the output transformer from the power tube of the receiver. The balance of the receiver is not shown.

The voice coils of dynamic speakers consist of only a few turns of wire, in some cases only one turn and, therefore, we have a very low impedance of somewhere between 1.5 to 15 ohms. The impedance of a moving coil speaker is measured at 400 cycles for matching purposes and at this frequency the load is practically resistive. A rough approximation can be made by measuring the d-c resistance of the voice coil with a bridge or ohmmeter and

multiplying this value by 1.5. The impedance of a speaker is a combination of electrical and acoustical components and depends upon the motion of the diaphragm, the way in which the diaphragm vibrates, that is, as a unit or in segments, the cabinet in which the speaker is mounted and other factors. The value of the impedance increases steadily with the increase in frequency,

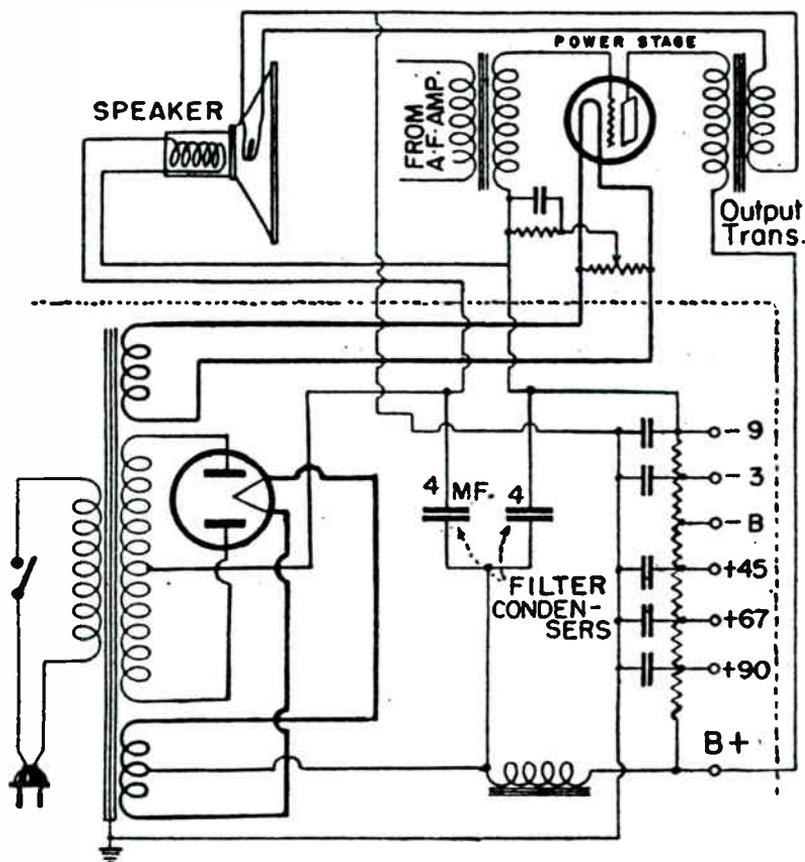


Fig. 23-13.—Diagram of a power supply unit, dynamic speaker, and the last stage of power amplification of a receiver. Note the field coil of the speaker is connected in series with the negative lead of the D.C. plate supply and serves as one of the filter chokes. Also note the connection of the cone coil, or voice coil to the secondary of the output or speaker coupling transformer.

## Sound Reproducers from Headphones to Cone Speakers Continued

and at low frequency, the resonance point of the speaker rises sharply in the region of 50 to 150 cycles, depending on the size and construction of the speaker.

The rated or optimum load resistance for any tube is determined by the grid, plate and screen voltages, if any, and the tube construction. All leading tube manufacturers publish recommended conditions of operation for any one type of tube which they make, and these should be followed closely as possible. Best results are obtained if a tube operates into a pure resistance load and all values given in the tube data book assume this condition. In most cases, triodes and beam tubes require a relatively low plate load resistance; pentodes require relatively high plate load resistance. Low power tubes, especially battery operated tubes, work best with comparatively high plate load, even up to 20,000 ohms in some cases. In order to effectively transfer the energy from the high impedance plate circuit of the vacuum tube to the voice coil, which is low impedance, it is necessary that a step-

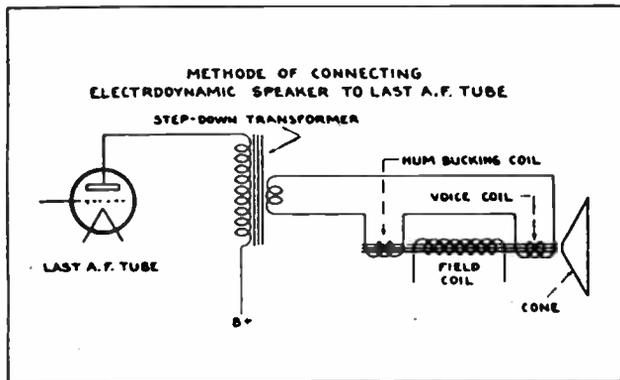


Fig. 23-14.—This figure shows a dynamic speaker connected to the last stage of a radio receiver. Note how the hum bucking coil is connected in series with the voice coil.

down transformer be used. This is really a device for matching impedances, thereby giving a good transfer of audio frequency with least distortion. The connection of such a transformer can

be seen in Fig. 23-14. Here is also shown a hum bucking coil found on some types of speakers.

In cases where the speaker field coil is used as a choke in the filtering system of the power pack, there may be a slight pulsation of the d-c thru this coil, setting up a small a-c voltage in the voice coil. This will cause a steady hum to be heard from the speaker. The hum bucking coil, consisting of a few turns of wire, is placed next to the field coil as shown on the left in Fig. 23-14 and has induced in it a small a-c voltage equal to that existing in the voice coil. By use of a series connection with the voice coil and transformer secondary, the a-c from the hum bucking coil is made to buck out or neutralize the a-c in the voice coil, thereby eliminating the speaker hum.

One type of dynamic speaker has no field coil, a permanent magnet being used to furnish the magnetic field. This type is used in any type of receiver. It has an advantage in battery operated sets, where the additional current required by a field coil is a major factor.

For the reproduction of the extreme upper range of audio frequencies, in high fidelity sound, an additional speaker is often used and is known as a "tweeter." Such a unit is helpful, due to the fact that the average large diameter speaker reproduces more efficiently the lower and middle range of frequencies.

In dynamic speakers, one of the most common troubles is due to the voice coil being off center and rubbing on the pole faces of the field magnet. An inspection of the opening in which the voice coil moves will reveal that the clearances are very small, consequently the coil must be exactly located or it may rub, setting up a distinct distortion in the sound output.

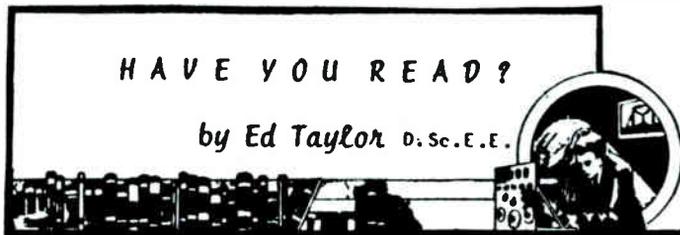
If a speaker is suspected of this trouble, disconnect it from the set and very gently push the cone up and down, by placing the fingertips on either side of center and near the outer edge. If the voice coil is rubbing, a scraping movement will be felt. Now loosen the centering screw and insert through the spider openings speaker shims equally spaced and so located that they pass between the center pole and voice coil form. All shims must be the same size and must have a snug fit. Tighten the centering screw, remove the shims and the speaker is ready for trial.

Occasionally dirt or metal filings will lodge in the voice coil opening and these may be cleaned out by the use of compressed air or in some cases it may be necessary to entirely remove the cone and voice coil while the foreign material is forced out with a piece of stiff wire or other prod.



HAVE YOU READ?

by Ed Taylor D.Sc.E.E.



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Bill Howard, Publisher

The *Wireless Trader* is a new classified advertising publication pertaining to the antique radio hobby. The newsletter type format is published twice monthly to allow for quicker ad response.

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The subscription rate is \$16.95 per year (24 issues) prepaid to: Trader Publications, 4290 Bells Ferry Road, Suite 106-36, Kennesaw, GA, 30144. For additional information phone Mr. Howard at 404/908-7327.



## **Excerpted from:**

### ***The Harbor Beam* Michigan City Amateur Radio Club**

**Harry Garba, IHRS Member 1987 - 1992**

#### ***Silent Key***

It is with very deep regret we report the passing of Harry Garba, W9LBE. Harry was a faithful member of the Michigan City Club and served in most Club offices at some time over the years of the present organization dating from around 1955. He became the Club Trustee for the Club call of W9CSF when it was first obtained and continued to hold that office until his death. Everyone that knew Harry was made aware of his ability to handle fast CW (code) once they had heard him or watched him work through a sea of signals during our Field Day operation.

His amazing ability was honed through his work as a Police Communications Officer in Lafayette, Indiana. His predecessor was Glen Rodgers, W9ASX, who became a life long friend. In 1954, Harry moved to Michigan City when the TV manufacturing firm DAGE moved here from Beech Grove, Indiana. While employed by DAGE, Harry was responsible for Field Engineering of low power television stations that were manufactured or assembled at DAGE and shipped to U.S. Military installations all over the world. Harry oversaw the installation of all equipment on the bases pertaining to the television station and trained the military operating crews before returning home.

Subsequently, Harry served as Chief Engineer at Channel 50 TV located in a high school in Dyer, Indiana. Later he went to Channel 11, Chicago with antenna and transmitters located in the Sears Tower where he became the Chief Transmitter Maintenance Engineer. Along the way, Harry was in demand for special assists at Michigan City's AM station, WIMS and the FM station WEFM. Another long time friend, Bob Schilling, Engineer at WIMS recalls a filed survey that he and Harry accomplished plotting the radiation pattern for the station a number of years ago. Harry received his technical expertise while attending the Dodge Institute later named the Valparaiso Technical Institute or simply, VTI.

Incidentally, Harry was for a time Editor of the Harbor Beam and maintained a file of them for many years. Even as Harry's health problems mounted, he was active in Amateur Radio. When he retired, he became a faithful member of the Indiana Phone Net meeting every day on 3910 Khz at 4:30 pm. He enjoyed meeting fellow Club members for breakfast at a local restaurant on Saturday mornings. A more recent friend is Ray Awe, AJ9H, who started a career in police work, but switched to electronics and followed Harry at Channel 50. This editor first met Harry at DAGE in 1954 and feels a great personal loss of a close friend. Perhaps most notable of Harry's many attributes were his honesty, integrity, and his fastidious attention to technical details in his electronic work. He was one of a rare breed of engineers and will be sorely missed by all he came in contact with during his life. de K9ET.

# RadioAdds

## For Sale:

Hallicrafters S20R, Best Offer, available from non-member, Jim Bradley, (317) 689-8082.

## For Sale:

1939 Scott Phantom, Best Offer, available from non-member, complete with cabinet, average chrome, needs grille cloth, and cabinet attention, John/Judy Bruch, 1045 Hoover Circle, Indianapolis, Indiana 46260, (317) 253-3867.

## For Sale:

Atwater Kent 55C in Keil Table, Philco model 41RP2 Wireless Record Player, contact George Clemens, 851 Wooster Street, Bowling Green, Ohio 43402, (419) 372-2824.

## For Sale:

Hallicrafters Continental Portable, 5R40 S.W. set and 5R10A Communications type S.W. set, both nice and working at \$22.50 each, PPD; decent AK35, \$35, PPD; Hallicrafters Super Sky-Rider SX-16, works and looks nice, \$65, but you must pick up, or I could possibly deliver to next IHRS meet. George Hausske, 1922 E. Indiana Street, Wheaton, Illinois 60187, (708) 668-3845.

## For Sale:

Several old Edison battery oil bottles \$3 @/2 for \$5; Philco 20 chassis and speaker \$50; Crosley 51, \$120; RCA 33, \$25; Empty AK40 case & lid, \$12; WANTED: Kennedy Panel for XV or XVI. Walt Sanders, 15 Todd Drive, Terre Haute, Indiana 46517, (812) 877-2643.

## Wanted:

1934-35 General Electric modern console model M-66, M-85, M-129, A-85, A-86, A-87, A-125. Want in playing condition. Write John Checchio Jr., 2629 Decamp Court, Apt. 124, Elkhart, Indiana 46517, (219) 295-7230.

## HELP!

Does anyone know the source for Atwater Kent COIL WIRE? I'm sure I'm not the ONLY person looking for this! I could even live with white wire. Please write or call if you can help...I have several old (1929-35) I.F. coils. If you send me a good description, I will go through my boxes. I also radios to trade for Western Coil sets I don't have. Thanks! Eric Sanders, 3295 West 246th Street, Sheridan, Indiana 46069, (317) 758-4988.

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## Radio Quiz Answers:

1. The ONLY woman wireless operator in 1924 (Radio News, Apr., 1924, p. 1405).
2. On the Lackawanna ferry-boat crossing the Hudson River (Radio News, May, 1925, p. 2067).

