

NATIONAL

RADIO

NEWS

FROM N.R.I. TRAINING HEADQUARTERS

Vol. 1—No. 8

WASHINGTON, D. C.

MARCH, 1929

IN THIS ISSUE
Servicing Radiola 60
Tobe Power Supply
Designing Small Transformers
Prize Contest Announcement

PRES. HOOVER

as he appeared in a recent speech over a large "hook-up." He is one of Radio's best friends.



HOOVER, AS A CHILD



— AS A STUDENT



— AS AN ENGINEER

Every N. R. I. Man Should Get In On This Prize Contest

Aside from the money prizes we are giving in this contest you will be interested to know that you men may get still more recognition in Radio circles. Let me tell you about it. A number of men have approached us on the idea of writing newspaper and magazine stories about the Institute and our students and graduates. Now they need some definite material to work on and that's the reason for this contest.

Don't lay this magazine aside until you have sent in your contribution to the Contest Editor. Better sit down and write yours as soon as you finish reading this article. You not only have the chance to win a cash prize but there is a possibility of getting some very valuable publicity for yourself and for your old N. R. I. which is standing right back of you all the time.

The men who want to write newspaper and magazine stories for us realize that you fellows are doing some mighty fine work in Radio, that many of you are employing original ideas and plans for getting and handling spare time or full time Radio business—and that's what they want to base their stories on. Now, I am going to try to tell you just the kind of information we want. We are going to give four first prizes, but all acceptable material that you send will be turned over to these men who want to write the articles. Real good ideas may be passed on to other students and graduates by us—but not to men in your immediate vicinity, of course, as we would not make competition for you.

Below I am listing subjects on which we want you to write. Be very definite in your explanation and accounts on these subjects. Write on all of them if you can. If you cannot, any one or any number of them will be all right.

If you write on more than one, use a separate sheet of paper for each article.

The prizes are going to be \$10 each for the four best and if we get some that are good enough to get recognition, but not quite good enough to fall in the first prize class, we will hand out some additional \$2 and \$5 bills to those.

Now here is the idea. I'll bet each of you has your own pet way of doing or handling some phase of your business. One fellow out West, as an example of the kind of material

we want, has a sign outside his door which reads about like this: "Come in and ask questions—no charge for help on your Radio problems." You get the idea behind that, don't you? That fellow wants people to come into his store, so he can make their acquaintance and is willing to answer their questions without charge just to get them in because he knows that sooner or later he is going to sell them some material, or perhaps have the chance to fix their set.

Another fellow I know sends out a little mailing slip to the people in his neighborhood who have Radio sets asking them whether they can get certain stations on their Radio sets. He lists the stations. Then he tells them that they should be able to get them—if they cannot—he will fix their set so they can tune them in. Now that's a clever little stunt to get business. Those are only two of the many ideas I know about—and I'll bet that almost each of you knows of the uses as many as come to my attention.

Now, I want you to tell me your plans, ideas and other things I ask for in the subjects listed below. They will form the basis of this newspaper and magazine publicity campaign. Wherever possible your name will be mentioned in the articles when any of your ideas are used.

Here are the subjects:

1. List the plans you use for getting spare-time service jobs and give the approximate results in number of jobs you get in relation to money and effort expended.
2. What are your plans for meeting the dealer competition which offers free service on Radio sets they sell.
3. Give me your plans for handling installment sales.
4. How do you handle open account sales—how do you do your financing.
5. Explain in detail your hardest selling problem and how you are overcoming it.
6. Explain in detail your advertising—how much space—how often, type of ad, appeals and other points you want to bring out.
7. List and explain any special schemes that have been working extra good for you in getting service jobs or buyers for parts and sets.
8. If you put sets in homes on trial, explain how long a period of time you allow them to stay, and your success in selling such people.
9. Explain in detail the nature of the service jobs most common in your vicinity, how you correct them.

Read back over this list again. Pick out those that you can answer—that apply to you—and write out your article in not more than 150 words on each one. The four winners will be awarded \$10 each. Other good articles will be paid for. All material that is used will be paid for although they all may not be prize winners. Now get busy. Make some extra money for yourself, and get your name in the papers.

The contest closes April 5. All manuscripts must be in this office by that time. Don't put it off. Start writing up your plans and ideas NOW. Send them to contest editor.

National Radio News

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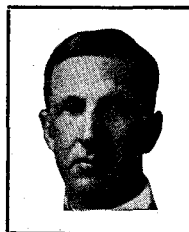
NATIONAL RADIO INSTITUTE

Washington, D. C.

March, 1929

OUR COVER—The Inauguration of President Hoover on March 4th has suggested our cover for this issue. The new President is the first engineer President since George Washington and is everywhere regarded as one of Radio's warmest friends. He has been closely associated with Radio's early development and control and understands its problems and opportunities of today.

Most Successes are Built on "Tough Breaks"



AS I start to write these few lines—this little talk with "my boys"—this question stands out in my mind: What one thought do I want to put across to N. R. I. men this month?

I feel a responsibility of the keenest sort every time I write this page for it is in getting together this way that enables us in a large measure to solve our common problems and march onward to our common goal in Radio.

And yet it is a very easy thing for one to be thrown off the track—to lose one's grip on things—to lose sight of the intended goal. Some will let a trivial thing stand between them and the success they want, others will go a little farther, but after meeting defeat a second time will lose heart and drop out of the race.

Yet the men who have achieved the most remarkable successes in the world are those who have come back after a series of successive skirmishes and defeats to win everlasting fame and fortune.

Thomas Edison was thrown out of school before he was ten years old because the teacher said he was too hopelessly stupid to learn anything. A few years later while "tinkering" in his small experimental laboratory, he was in such poor financial circumstances that creditors threatened to ruin him—but he stuck it out, and today no name is more widely known throughout the civilized world than his.

Then there is the story about Lincoln, who, it seems, thrived on adversity and defeat—only to come back the next time still more determined to push on through to the end and win.

At the age of twenty-three Lincoln was defeated as a candidate for the Illinois legislature. Before he was thirty he was a candidate for Speaker of the House, in Illinois, and was defeated. Two years later he was defeated a second time when he ran for the same office. At thirty-four he was a candidate for Congress and was defeated. At thirty-five he was defeated as a Presidential elector. At forty-three he was again defeated as a candidate for Presidential elector. At forty-six he ran for the United States Senate and was defeated. At forty-seven he was a candidate for nomination for the Vice-Presidency and was defeated. At forty-nine he was defeated a second time as candidate for the Senate. At fifty he had known little but defeat.

Yet think how gloriously and nobly he ultimately triumphed. Had he been easily discouraged, had he lost patience, had he exhibited less backbone, he never would have accomplished for America and for humanity what he did accomplish.

We all know the Lincoln at the height of fame and triumph, but too few of us know him as a man faced with endless problems and seemingly insuperable difficulties—as a man who met several stinging defeats before he finally triumphed.

We can read the life histories of hundreds of big men and learn that, the same as with Edison and Lincoln, those who make the biggest success are those who have refused to be thrown off the track by every little difficulty that pops up in front of them and even refuse to lose sight of their ultimate goal after several pretty hard lickings.

I wonder if there isn't a thought in this for every one of us. I wonder if we wouldn't win out in the end if we would go to the mat with every tough problem we get, lick it or get licked in the attempt, and then come up smiling regardless of the outcome and head straight for the next problem. I believe that if a man will just keep his eyes glued on the top rung of the ladder that he will get there sooner or later—he'll get there if it's humanly possible, and that's lots better than becoming discouraged and giving up early in the game.

That's the thought that I want to leave with you N. R. I. men this month. Just come up smiling when a "break" goes against you—thrive on it, and you're bound to win.

J. E. SMITH.

The STUDENTS mailbag

"I would not take ten thousand dollars for what I have already learned from this course." Mr. Lexie B. Jordan, 11606 Goethe Ave., Detroit, Mich.

"I made \$45.00 in two hours time—not a bad night's work, I think." F. E. DeMerse, 5340 Lakepointe Ave., Detroit, Mich.

"I am a projectionist employed by the Arcadia Amusement Company. We are installing Vitaphone and Movietone equipment and as a Movietone projectionist my salary will be increased about fifty per cent and for my knowledge of batteries and amplifiers (gained through my course with N. R. I. and your patience and teachings) my salary will be boosted again about fifty per cent." E. L. Britton, P. O. Box 102, Tyler, Texas.

"I've made \$300 clear profit in four months' time repairing and installing receiving sets." Charles Davis, 1545 So. Spaulding Ave., Chicago, Ill.

"I have made as much as \$10.00 a day clear profit." Roy Bernt, 2510 14th St., Columbus, Nebr.

"I am now making about \$70 a week and work for the Radiola Sales Service Company of Philadelphia." Chas. Agner, 7922 Frankford Ave., Philadelphia, Pa.

"I got a job with the largest Atwater Kent dealer in the city yesterday. Gee, it seems like a dream to get a job like this already, because I have only been taking your course for five weeks." Earl H. Eckenrhods, 1976 Woodvale Ave., Reading, Pa.

"I want that valuable Diploma with honors; the N. R. I. name means so much in this county." Ernest G. Canham, 629 5th Street, South, Lethbridge, Alta., Canada

"I have made over five times the price of the course in the 'last six weeks'." Geo. F. Doan, 327 Second St., South, Kenora, Ont., Canada.

"My first spare-time job yielded more in profits than the cost of the entire course. It was a built-to-order six-tube receiver, employing three screen grid radio frequency amplifiers, powered from battery eliminators. I equipped this set with a dynamic speaker of my own design. This installation alone brought about \$118 in clear profit! Furthermore you may be interested in knowing that one of your Radio-Triclan cards is an 'open Sesame' in any radio establishment. I certainly appreciate the prestige that goes with N. R. I. training." Frank A. Seitz, Jr., 448 North Broadway, Yonkers, New York.

"Last month I cleared \$115.80 in my spare time and the way it is going so far this month I am going to double that. I thank the National Radio Institute for all this." C. A. Keim, 603 E. Thomas St., Hammond, La.

"Thanks for your many letters of encouragement and kind treatment of me during the past year; when things looked hard it was a pleasure to know you were at the other end ready to help." P. Maroney, 357 E. 68th St., New York, N. Y.

"I am still holding my job in the garage, selling and servicing Philcos for a dealer, and taking care of my own trade, too. I make as much in four evenings a week in Radio as I do in six days a week in the garage. They have me so busy I have to refuse work so I can see my girl once in a while." George A. Wild, 1905 Baldwin Ave., McKeesport, Pa.

"Recently I have had more repair work than I could do. I have also sold eight sets at a fine commission. Altogether I averaged better than \$43.50 per week spare time." F. L. Hale, 1605 Fairview St., Apt. 8, Detroit, Mich.

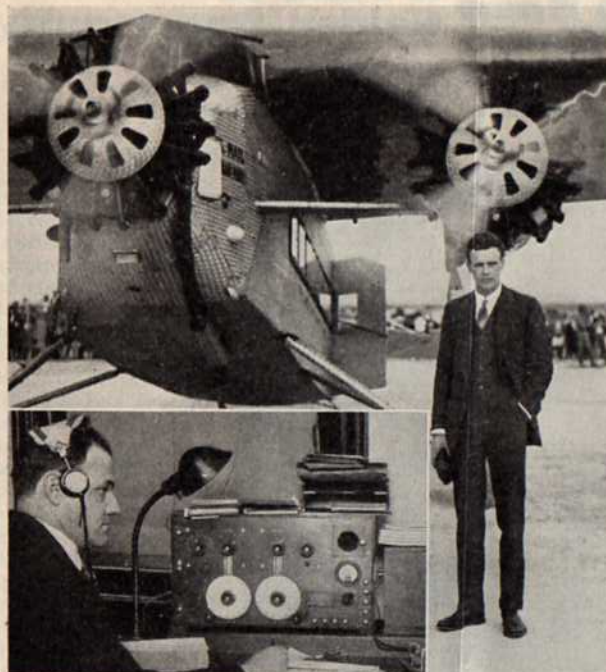
"The article on the Philco receiver in the November issue of the National Radio News and also the one on the Ever-Ready set in the January issue are mighty fine and one of the greatest possible aids to the service man." C. Washburn, Jr., 226 East 15th St., Jacksonville, Fla.

"I first wrote for 'Rich Rewards in Radio' for curiosity sake as I did not think it possible to learn anything about Radio through correspondence, but after reading it through I decided to take a chance. Well, I took that chance, Mr. Smith, and today I am not afraid to tackle any kind of set. I have repaired Atwater Kents, Freed-Eiseman, Fadas, Crosleys, Wares, Murdock, Bosch, Sonora, De-Forest, Hayes, Westinghouse sets and other makes. So you see what the N. R. I. course has done for me. I quit school when I was in the sixth grade so you see a man does not have to have a college education to take up the N. R. I. course." Stanley Nyzman, 2 Hanover St., Stamford, Conn.

"Thank you a thousand times for the information in the National Radio News about the Ever-Ready Receiver. This kind of news is very valuable to me." Andrew Mills, Box 104, Auburn, Ind.

"I've been at this Radio game since 1914 and I got more knowledge of it in your first 6 lessons than I got in the whole 14 years." Mr. George D. Young, Box 44, Hilliards, Pa.

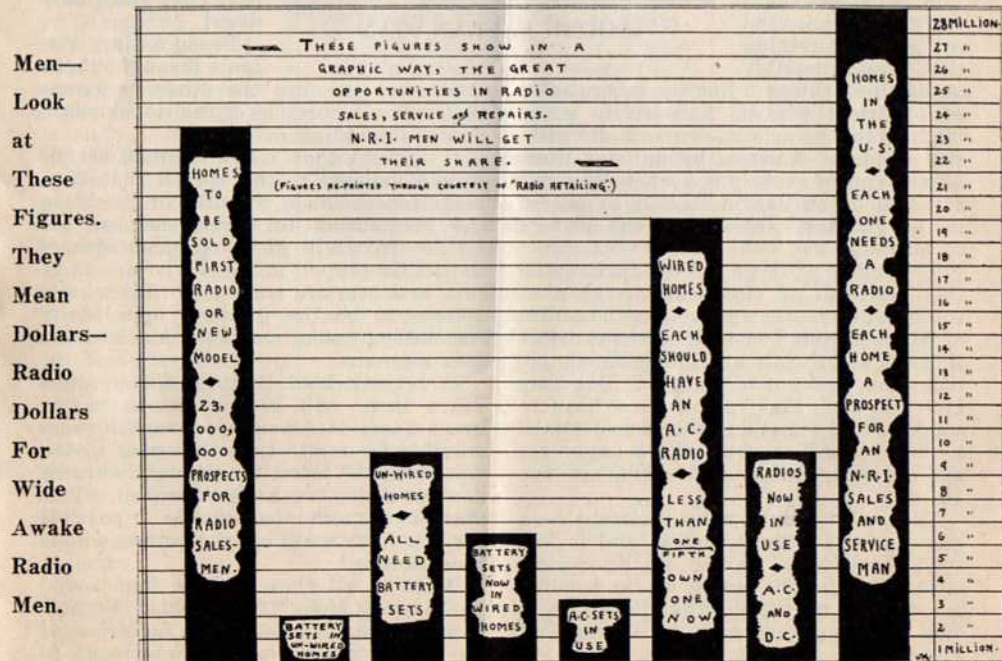
Two Signs of Future Progress



The many ways in which Radio is aiding aviation spells unusual opportunities in this new field for Radio trained men.

New airways and airports are being developed rapidly. This picture shows Colonel Charles Lindbergh standing in front of a giant mail plane just before his flight to Panama. His flight inaugurated this new mail service. He was accompanied by radio operator Henry Buskey and an official of the Pan-American Aircraft Corporation.

Lower inset shows Operator T. J. Schwarzmann at the telegraph key which controls a powerful Radio transmitter at the Arlington Naval Radio Station. This is called the "nerve center" or Radio Headquarters for Uncle Sam's National system of Civil Airways. Important data, weather reports and information are transmitted to aviators from this station.



RADIO—A Field of Golden Opportunity

By MARTIN F. FLANAGAN

Executive Secretary Radio Manufacturers' Association



MARTIN F. FLANAGAN

THE mystery of radio has captured the imagination of the world. The stirring role that it has taken in the drama and romance of the earth has given this modern instrument instant popularity in every class of society.

Just a few short years ago people thought that science had reached its limit when such great inventions as the telephone, the telegraph and the moving picture camera were brought to a point that neared perfection. It was hard for the human mind to grasp anything that could possibly outdo these things. But the laboratories of electrical wizards had barely given birth to the miracle known as radio when the people of America by millions literally swamped every place where one was for sale or on demonstration to accord it the greatest welcome in the history of business.

The public at large did not understand this new use of electrical energy that could bring music and voices thousands of miles through the air without wires through steel walls and make the simple little box perform like magic. But they knew at once that radio was a boon to mankind and something that was destined to bring families everywhere happiness and advantages that no previous age has known.

The radio industry immediately took giant strides toward success and it was soon conceded to be one of the world's most powerful influences whose benefits are as free as the air that brings it to our ears! Everybody is tuning in! Farms miles from the nearest village are

linked to the city markets and amusements; town folk who have never been out of their county hear stars of the stage as plainly as those in the front rows of Broadway's theatres. Even the highest and mightiest men in the land rely upon radio to carry their voices into these homes.

Dwellers in the big, crowded cities have found in radio a new and thrilling pastime. Radio remade the Universe! It has become in a short time the vital part of our daily lives!

Broadcasting stations throughout the land send out into the ether programs that make the peoples of the world neighbors. Just think of it!

It is said that more than 30,000,000 people listened to the speech that Herbert Hoover made recently in accepting the nomination for presidency of the U. S. That will give you some idea of the millions upon millions who are radio fans and who are responsible for what I believe to be the greatest opportunity for earnest young men that America has ever offered.

It is estimated that in a few short years there will be a radio in nearly every home in America. I wish it were possible for me to take the space to tell you about the latest inventions that radio has developed, such as television. This marvelous mechanism makes it possible for you to actually see the person who is broadcasting!

Back of all these things that sound like a story from "The Arabian Nights" there stand the beautiful factories of the radio world giving employment to

tens of thousands and needing additional tens of thousands of skilled radio experts to help them in their work.

One factory that produces a popular radio, whose name is a household word, covers more than sixteen acres and employs more than six thousand people. But the building of giant factories is not the most serious problem the radio manufacturers face. It is man power! Here is a field that utilizes the science of electricity in its most interesting form and these manufacturers need men with training to design and make the millions of receivers that are sold each year. Men of this type are not only needed in the factories, they are needed in the retail stores and wherever radio is dealt with.

A trip through any radio plant is the most interesting sight you can imagine; interesting to me because here more than in any place I can think of young men are holding positions of the highest importance. Radio has always appealed to young men. It was the youth of America that first introduced radio to the world and radio still is young America's golden opportunity.

The industry itself compared to others, such as the automobile industry, is but a baby among the businesses of first magnitude. This, combined with the fact that radio is typical of American youth in its originality, vitality and progressiveness is another reason why it is such a rich field for the younger generation and one which offers them in my opinion such a marvelous opportunity.

I cannot help but think as I recall some of the beautiful factories that I have visited all over this country how many thousands of young men who are now earning pay so low that they can hardly live on it who could easily be holding one of the many high pay positions that are open and waiting in the radio industry.

I do not want to give the impression that work and study are not necessary in this field as in all others. The men at the top in radio, many of whom are still

very young, are the ones who put their very soul in their work. I am going to quote some of these men to give you some idea of what they think about the opportunities that are waiting for young men in this field.

One manufacturer in Springfield, Massachusetts, says: "The radio industry has grown more rapidly than any other, and is one of the few in this country that is constantly short of good men in all branches. In my opinion, the field is wide open and there is plenty of opportunity. A real good radio service man will have many opportunities to step up into higher jobs either in the sales or engineering or manufacturing departments of the business."

A friend of mine in Chicago, a very prominent man in radio, says: "A service man who has in addition sales ability should be able to earn up to \$30 per week with a dealer, \$50 a week with a jobber and as much as \$100 per week as an engineer for a manufacturer."

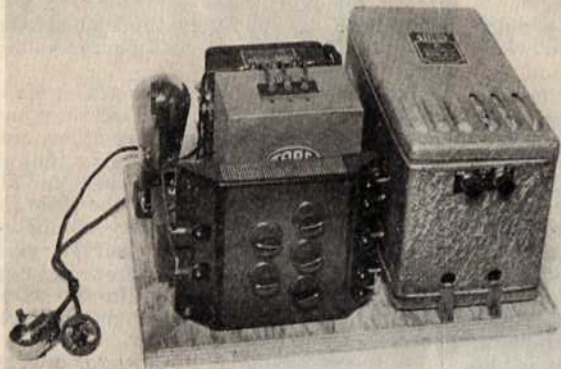
I believe my friend is very conservative in his statements as I know many men working for radio dealers that are earning \$75 a week and more, men working for jobbers that are earning \$100 a week and more and executives of manufacturers who are earning \$10,000 and \$15,000 a year.

The first step to independence in radio, in my opinion, is first class training. A radio expert is welcomed everywhere and if you have real training the doors of radio will be gladly opened for you.

My advice to young men who are seeking to enter this field is to start right. That is half the battle. Radio is not hard to master. In fact, it is quite simple. Proof of the fact that radio is accepted as being a leading industry and profession is that some of our

famous schools have included a course in radio as a means of giving this industry men who can step into any branch of the business, especially the service and manufacturing divisions and be of real value to their employer from the very first day. The radio industry is growing so rapidly that it can easily absorb thousands of men with training each year. Perhaps among the readers of this magazine there are many who will be in the front ranks of the men who will achieve fame and fortune in radio in the near future.

EDITOR'S NOTE: We feel that N. R. I. men will find Mr. Flanagan's article most interesting and informative. The author is certainly in a position to know "what's what" in Radio. He is Executive Secretary of the Radio Manufacturers' Association which is the leading organization of its kind in the world. Its membership includes the largest and most famous manufacturers of Radio sets, parts and accessories, and it is naturally the center of news and facts pertaining to the Radio Industry.



Tobe Power Supply

By ARTHUR MOSS, Pres.,
Electrad, Inc.

cluded in the Thordarson Compact type R-280.

All but one of the condensers used are included in the Tobe condenser block. An extra condenser C.5 is used to by-pass the intermediate C. bias voltage. All resistances of the voltage divider circuit are included in the Electrad Truvolt Divider D. This unique unit also provides a control panel and binding posts for the various B. and C. voltages. The five knobs are used to adjust B. and C. voltages and since the divider is calibrated, proper operating voltages can be obtained for any conventional type receiver. The booklet supplied with the divider gives complete information and the voltage adjustment is extremely simple.

The A. supply is a complete unit that contains a step-down transformer, rectifier and filter system. There is an adjustment provided that enables one to obtain proper filament voltage for any conventional receiver.

(Continued on page 15)

THE most popular Radio sets of today and of the future must operate from power lines which now provide lighting current in the modern home. The most common current source available is 110 volts A. C. The tubes used in a receiver must be supplied with A. B. and C. voltages. The B. and C. voltages must be direct current and this is obtained by stepping up the line voltage through a transformer, rectifying this higher voltage by means of a rectifier tube, which produces a pulsating voltage. This voltage must be filtered to eliminate the pulsations and then divided by means of a voltage divider which delivers usable B. and C. voltages to a receiver.

Most electric receivers now manufactured use the A. C. type tubes which merely require a step-down transformer for supplying their filaments with power. This type of A. supply has been proven practical for the manufactured set as well as a kit set when adequate engineering has been used in its layout and design. Many experimenters and fans, however, have encountered nothing but grief in attempting to use the A. C. type of tubes to electrify their sets which were designed primarily to use D.C. type tubes.

There are many sets that represent a considerable investment to their owners which have been discarded simply because of the nuisance and expense of the batteries needed to supply A., B. and C. voltages. This article describes a complete A., B. and C. supply which operates from house current and is simple to build. It is made of compact units of most modern design and there is very little wiring.

Figure 1 shows the wiring diagram. The transformer T.1. and choke coils, CK., are in-

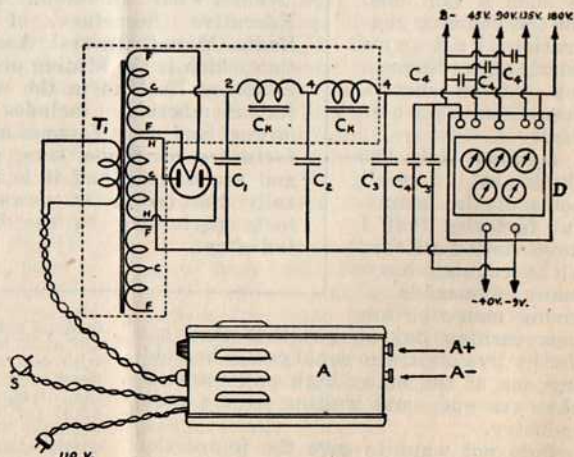


FIG. 1

Radio-Trician's Service Manual on The Radiola 60

The Radiola 60 is a socket powered Radio receiver employing an 8-tube fundamental Superheterodyne circuit, and a full-wave rectifying circuit. Seven Radiotrons UY-227, 1 Radiotron UX-171A, and 1 Radiotron UX-280 are used. The socket power unit provides all plate, grid, and filament voltages used in the receiver assembly.

This receiver is designed to operate on alternating current of 105 to 125 volts, 50 to 60 cycles, such as is used for house lighting. Connection to the D. C. lines or to A. C. lines of different rating may damage the Radiola or Radiotrons.

The Radiola 60 is also made up in models designed for 105-125 volts, 25-40 cycle A. C. operation, the difference between this and the 50-60 cycle instrument is the power transformer. Should it be desirable to change a 50-60 cycle Radiola 60 for operation on 25-40 cycles, or vice versa, a change of the power transformers is all that is necessary. These transformers may be obtained through the regular RCA channels as a replacement part.

The following circuit characteristics are incorporated in the design of the Radiola 60. See Fig. 1.

The circuit consists of one untuned coupling stage, one tuned RF stage, a tuned heterodyne detector circuit, an oscillator, two intermediate RF stages, a second detector and a power amplifier.

The second detector, operated at 160 volts plate potential with grid bias, changes the radio frequency current of the intermediate stages to audio frequency current. This gives improved quality and sufficient output to operate the power tube directly from the second detector, thus eliminating any distortion that might be present if an intermediate audio stage were used.

The volume control regulates the grid bias on all radio and intermediate frequency amplifying stages, giving a positive control of volume even on near-by local stations, without distortion.

The use of the indirect heater type of Radiotron permits the connection of power amplifiers such as loud speakers 104, and 105, to the detector without developing excessive hum.

Radiotron No. 1 is an untuned stage of radio frequency amplification. It is coupled directly to the antenna and ground across a resistance and functions as a coupling tube to the antenna system.

Radiotron No. 2 is a stage of tuned radio frequency amplification. It is tuned by means of the first of the gang condensers.

Radiotron No. 3 is the tuned heterodyne detector. It is tuned by the center of the gang condensers.

Radiotrons No. 4 and No. 5 are the first and second intermediate frequency stages. These stages are tuned to a frequency of 180 kc., giving ample distance between the two peaks of the oscillator to eliminate any possibility of stations coming in at more than one place on the tuning dial.

Radiotron No. 6 is the oscillator. It is tuned by the third of the gang condensers. Two trimming condensers are provided at the rear of the receiver assembly for adjusting the oscillator circuit to keep the resultant beat note at the correct frequency for the intermediate stages.

Radiotron No. 7 is the second detector. It operates at a plate potential of 160 volts, with the proper grid bias and does not use a grid leak or condenser. Its output is sufficient to drive the power amplifier.

Radiotron No. 8 is a power amplifier stage. An output filter is provided for keeping the D. C. used with this tube out of the loud-speaker windings.

INSTALLATION

Antenna, Out-Door Type

Due to the high sensitivity of the Radiola 60, the antenna length need only be approximately 25 feet. It should be erected as high as possible and be removed from all obstructions.

Antenna, Indoor Type

Where the installation of an out-door antenna is not practical, satisfactory results may generally be obtained by using an indoor antenna of about 25 feet of insulated wire strung around the picture molding or placed under a rug.

Ground

A good ground connection is quite a

important as a good antenna. No specific recommendations can be given in this matter as conditions vary in different locations. Water and steam pipes generally make good grounds.

Line Switch

A two-way switch is provided in the socket power unit for adjustment to line voltages. A shield over the terminal strip holds this switch in the 120-volt position. Unless it is definitely known that the line is always below 115 volts, the switch should be left in its original position.

RADIO-TRICIAN'S SERVICE DATA

Antenna System Failures

A grating noise may be caused by a poor lead-in connection to the antenna; or by the antenna touching some metallic surface such as the edge of a tin roof, drain pipe, etc. By disconnecting the antenna and ground lead, the Radio-Trician can soon determine whether the cause of complaint is within or external to the receiver and plan his service work accordingly.

Radiotron Prongs

Dirty Radiotron prongs may cause noisy operation or change the resistance of the filament circuit sufficiently to cause a hum in the loud speaker. They should, therefore, be cleaned with fine sandpaper periodically to insure good contacts.

Loose Volume Control

A loose volume control arm may cause noisy or intermittent operation. It should be bent slightly so that it makes firm contact against the resistance strip. To do this, it is necessary to remove the chassis from the cabinet. The volume control is then accessible.

Adjustment for Slack Drum Control

The main tuning condensers are controlled by a cable and drum arrangement giving a smooth action vernier movement that has no back lash.

After considerable wear or changes of temperature, the cable may become slack. To take up this slack, open lid of cabinet and turn the cable adjusting screw with clamp until the cable is taut. This screw may be seated after several adjustments are made, thus allowing no

further tightening of the cable. When this condition occurs, it will be necessary to slip the cable a half turn on the grooved drum.

Broken Condenser Drive Cable

A broken condenser drive cable should be replaced. However, if a new cable is not immediately available, a temporary repair can be made in the following manner, provided the break in the cable is not in that section that passes over the small grooved drum.

Splice and solder the two ends together. Splicing consists of interweaving the strands as with rope and not just twisting the cable ends together as in an electrical wiring splice. When soldering, use plenty of flux and a small amount of solder. Heat sufficiently so that the solder adheres to all the strands

Loud-Speaker Polarity

Use of an output filter in the Radiola 60 makes unnecessary any adjustment for polarity of the output current. Any type of loud speaker can be connected in a manner that gives the most pleasing reproduction.

No Signals

No signals may be caused by defective operating switch, loose volume control arm, defective power cable, defective RF transformer, defective IF transformer, defective AF transformer, defective oscillator coil, defective by-pass condenser, defective socket power unit.

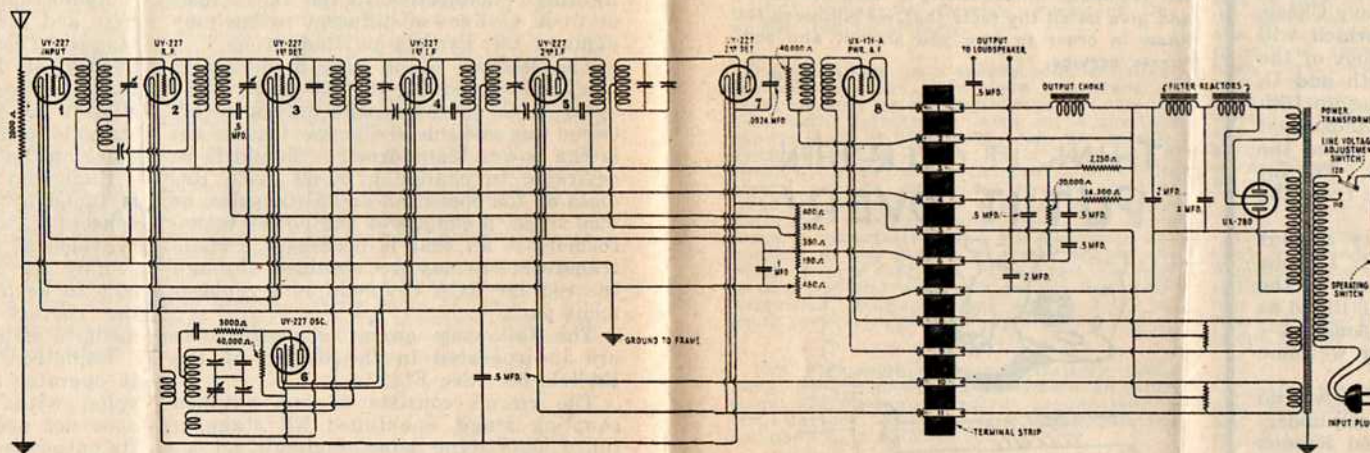
Low Volume and Weak Signals

This may be caused by defective antenna system, defective Radiotron, RF compensating condenser out of adjust-

mediate transformers out of adjustment, open of any of the several ground leads in the Radiola.

Voltage Reading

When checking the Radiola 60 for possible defects, it is a good practice to check the voltage of the sources of current. To do this, a Radio-Trician will need both an A. C. and D. C. voltmeter, the D. C. meter being 600 ohms per volt or higher in resistance. The following voltages at the terminal strip of the socket power unit are correct with all tubes in place and the line adjustment switch in the correct position for that particular location. The tubes must be in good condition, otherwise the D. C. voltages may be excessively high. The shield over the terminal strip must



Schematic Circuit Diagram of Radiola 60 and Socket Power Unit

Courtesy of Radio Corporation of America

of the cable. This is but a temporary repair to be used only until a new cable can be procured.

Hum

If a pronounced hum develops during operation, check the following:

Low emission Radiotron UX-280. A low emission rectifying tube will cause excessive hum and unsatisfactory operation.

Defective center tap resistance. A short or open of either of these resistances will cause a loud hum and imperfect operation of the Radiola.

Any open of the several grounding connections in the Radiola or voltage supply resistances may cause a certain amount of hum.

Use of Radiotron UX-171 instead of Radiotron UX-171A may cause an increase of hum.

ment, oscillator trimming condensers out of adjustment, intermediate transformers not correctly tuned or matched. Defective AF transformer or output condensers choked, low voltage from socket power unit, open or short of various connections in receiver. Check by means of continuity test and make any repair or replacement that is necessary.

Audio Howl

An audio howl may be caused by incorrect adjustment of RF compensating condenser, open AF condenser connection, open large by-pass condenser connection, vibrating element in receiver Radiotrons, poor ground, poorly soldered or corroded joints, defective resistance in socket power unit or the receiver assembly, neutralizing condensers in inter-

be removed before any readings can be made. The terminal numbers are counted from front to rear of the Radiola, No. 1 being near the front and No. 11 near the rear.

Terminals	Correct Voltage
1-7	200 D.C.
2-7	210 D.C.
3-7	160 D.C.
4-7	110 D.C.
8-9	5 A.C.
10-11	2.25 A.C.

Checking Resistance Values

When checking a Radiola 60 for possible troubles, it is always a good plan to check the various resistance values of different strips used both in the receiver assembly and socket power unit. These values are shown in the schematic circuit diagram, Fig. 1.

INAUGURATION VISITORS

Every N.R.I. man in Washington for the Inauguration should try to stop in and see us here at the Institute. Mr. Haas and I are making special plans to become better acquainted with you and show you the big strong school we have here to serve you.

The school will be open from 8 to 11:00 on Inauguration Day. Those of you staying over on the 5th and 6th can come out then, or any other time you are in Washington.

To reach the school take any of the busses running north on 16th Street and get off at U street. Or take a green street car marked Bureau of Standards, Chevy Chase, or Rock Creek Bridge which will bring you right by the door of the Institute. Get off at 16th and U. If you care to walk—come up 16th Street, Washington's handsomest boulevard and formerly called the Avenue of the Presidents. The Institute is about 1½ miles from the White House.

Just as the Capital city is your Capital, so is the N. R. I. your school, and when you come to the Capital city—the heart of Radio as well as the heart of America—you'll find a real hearty welcome here.

SPECIAL NOTICE: You who do not come to Washington will understand why your corrected lessons and other mail matter may be held up for a day or two. We will just have to stop and show N.R.I. men around when they come to see us.

J. E. S.

Let's Pull Together

The Technical Department is doing its best to give N. R. I. men rapid, accurate consultation service and technical aid.

You can **HELP THEM HELP YOU** by giving very detailed information when you write in for assistance—when you have any technical problems you want solved.

For instance, always give the **MAKE** and **MODEL** of the radio set which you ask about. Also give the number of tubes, whether it is an A. C. or D. C. When you give accurate details this way we are in a better position to tackle your problems quickly and get the solution back to you without any loss of time in trying to figure out some of the things that you could have told us easily in the first place.

So please remember—when you write in for technical information or help—be sure and give us all the facts that we will need to know in order to give you prompt and accurate service.

J. E. S.

THINK IT OVER—THEN
PUT IT OVER!



Several students have suggested that we make this "Go Getter Pup" the N. R. I. mascot. How about it? Let's go over the top in Radio with him.

GRADUATE CLARK TALKS TO BYRD

GRADUATE CLARK is the first N. R. I. man to report making contact with the Byrd Antarctic Expedition. A recent letter from him, at Davis, California, says:

"I have just completed a 50-watt transmitter, which I use out here. Only a week ago I was in communication with Commander Richard Byrd's Flagship, the City of New York. All was well with them."



"1929 will top all previous years in so far as volume of Radio sales is concerned. The time has come when every household must be Radio equipped." Douglas Rigney, General Manager, A. H. Grebe and Co.

"1929 will be a great year in Radio history." James W. Garside, President De-Forest Radio Company.

The prospects for a speedy commercialization of Television were given a tremendous boost recently by the organization of Jenkins Television Corporation with an authorized capital stock of \$10,000,000. Jas. W. Garside, President of De Forest Radio Company, is President of the new corporation. All of the rights, patents, etc., held by the Jenkins Laboratories, Inc., were acquired by the new Television Company and plans are being made to manufacture and sell Television apparatus to the public at prices within the reach of most everyone. This same company is now building what will be the first "All-Television" station in the world. It is located just north of Washington, D. C.

The Philadelphia Storage Battery Company, Philadelphia, has purchased an additional 100,000 square feet of ground with a large factory building which will enable the company to double its output.

Radio is being put to a new use by the American Rolling Mills, of Ashland, Ky. Several Westinghouse locomotives are used in their yards switching materials. Receiving sets are installed in the locomotives and the yard master uses a transmitter to broadcast orders to the operators of the different locomotives thus directing their movements.

The big merger between the Radio Corporation of America and the Victor Talking Machine Co. will probably have far reaching results in Radio. Properties valued at close to \$116,000,000 are now operating under one management. Among other things this ought to open up some new developments in Radiophonograph combination sets.

In our eagerness to recognize the commercial and entertainment possibilities of Radio we often overlook the wonderful feats it is accomplishing in the field of Radio surgery, and other fields having to do with the welfare of mankind.

A new Radio device has recently been perfected to enable the deaf to hear. Twenty Canton, Ohio, school children who had never

before heard their teacher's voice were the happy subjects of a successful experiment with what is called the "Radio ear." It was the first installation of its kind in the country. Each child was supplied with a head receiver and a simple dial apparatus to place on the desk by means of which he or she was able to tune on the voice much the same as the Radio receiver is tuned. This equipment also enables pupils who have never been able to talk to speak intelligently because they have heretofore been unfamiliar with the sounds of the human voice. Within a half hour after the test was begun the children were able to say simple words, because they were able to hear their own voices as well as those of the teacher who repeated simple words for their comparison. E. A. Meyers of Pittsburgh, Penna., is the inventor.

The Steinite Radio Manufacturing Company is moving into its larger, more modern manufacturing establishment at Fort Wayne, Indiana. The new factory covers 200,000 feet of floor space and will employ between two and three thousand persons. Production is due to start at an early date.

Construction has recently started on the new \$3,000,000 Atwater Kent plant which will double the size of the huge factory in Philadelphia.

The prospects for Radio and for Broadcasting never were so bright as they now appear standing at the threshold of 1929, recently said O. H. Caldwell, member of Federal Radio Commission.

The new year will see a larger market, due to the new buyers who have gone without Radio so far and are now tempted by the quality of reproduction and the lowered cost. The retail market will also increase in 1929. The richness of tone made possible by improved designs makes the owner of obsolete equipment dissatisfied with his set and re-producer. The progress in the distribution and quality of programs also is bound to show a marked increase in the use of Radio equipment in every section next year. Major H. H. Frost, President Radio Manufacturers Association.

"The Radio industry—both in the broadcasting and reception aspect, is now upon the threshold of its golden era. From all signs, this year is going to be Radio's greatest year." Major J. Andrew White, Managing Director Columbia Broadcasting System.

Successful Men "Sell" Themselves

By E. R. HAAS, Director



ALL through life we see many instances where two fellows will go to school together, study precisely the same subjects under the same instructor, and yet ten years later one of them will be a big salaried manager while the other will be just an ordinary plugger.

What accounts for this big difference in their degree of success?

Many times it is simply this—one "sells" himself—the other does not. So we find that men may know their business well, work hard and make only a mediocre success in life.

Some people call it "pull," which, of course, is all wrong. Others call it personality, but to put it in the easiest and plainest language, the best thing we can call it is just plain salesmanship—selling one's self—selling one's ability to the world.

Everybody has something to sell—whether it be the grocery delivery boy, the president of the Pennsylvania Railroad, or a foreman in a mine—everyone has to sell his services—sell his ability to those in the market for it.

Eight years ago, Watters and Burch were inspectors in a large Radio factory. Both had about the same technical knowledge of Radio and the same general ability, but last month Watters was made president of the company while Burch was finally promoted as foreman of the inspectors. Burch is making \$60.00 a week and Watters \$25,000 a year. What accounts for this difference?

Burch did his work well, he knew Radio and was a steady, consistent inspector, but he didn't take the time or bother to master the few simple principles of practical psychology that he needed to know in order to put his ideas across—to "sell himself" to men higher up in the

organization. As a result he stood still. He was simply an efficient cog in a big wheel.

On the other hand, Watters realized that there was something in mastering his job and then applying the sound principles of "selling himself" to his employers—in proving to them that he was fitted for something better—the next job ahead. He was regarded by the big men in the organization as a "live wire"—a "comer."

When the first opportunity for promotion came, he got it naturally. All the way up the ladder to the general manager's office Watters sold himself for the next step ahead.

Now this ability is not something that is inherited—men are not born with it—it can be acquired and developed—just the same as any man with average intelligence can learn to play checkers—and by much the same method. Understand the principles, practice and application and you can market yourself at your true value. The chances are your true value is far above what the world will pay you if you let it set the price.

Just the same as there are certain principles to be followed in selling goods, and certain things that should not be done, so there are certain principles to be followed in developing the ability to "sell one's self" to others. There are a number of important elements that enter into this, and it is something that every N. R. I. man will do well to think about. Therefore, in future issues of the National Radio News, I am going into the subject in more detail and take up several of these principles that should help you acquire and develop this ability yourself.

These articles will be built around such subjects as fearlessness, self confidence, ambition, will power, concentration, sincerity, and memory. They are going to be based on the statements and writings of successful men, and I hope they will go a long way toward helping you acquire the ability to convert your Radio knowledge into the greatest possible cash value.

Tobe Power Supply

(Continued from page 8)

There is also a receptacle into which the supply plug of the R-280 compact must be inserted. In this way one power switch operates all supply voltages to receiver.

If the set to be used with this power supply does not make use of a power tube in the last audio stage, much improvement of tone quality will be obtained by incorporating a 171-A type tube. An extra filament winding for the power tube is provided in the R. 280 compact, but it need only be used for this purpose in case the receiver has a total of more than six tubes. Otherwise, the A. unit can supply all A. voltage and the wiring is thereby simplified.

PARTS LIST

- 1 Electrad Truvolt Divider.
- 1 Thordarson Power Compact Type R.280.
- 1 Tobe B. Block Type 280.
- 1 Tobe By-pass Condenser 2 mfd., 200 volts.
- 1 T-1 A. Supply Model A.26.
- 1 U. X. Type Socket.
- 1 Baseboard 11"x14"x½".

103 Sussex St.,
Jersey City, N. J.

Dear Mr. Smith:

When I saw your course advertised I felt doubtful of the opportunity it held for me. I made up my mind to go on, and now I'm thankful that I did—and have now finished it.

I enjoy working in Radio. I even gave up my old job to make a career out of Radio. There's real pleasure in it and lots of money. Last year my earnings in Radio were around \$4,000. All of this is due to your course, for men who graduate from N. R. I. certainly have a thorough knowledge of Radio.

I would advise any man who wants to share in Radio's profits to take your course.

Sincerely yours,
NICHOLAS HERENCHAK.

Have ? You

started writing up your plans and ideas for the Big N. R. I. Prize Contest? See page 2 for details and get busy now—WIN A PRIZE and some free publicity.

LATE BULLETIN

Mr. C. N. Jansky, Jr., has just been appointed Federal Radio Commissioner by President Coolidge.

Students and Graduates will recall the splendid article on Radio by Mr. Jansky that appeared in the September, 1928, issue of the News. At that time he had charge of instruction in Radio engineering at the University of Minnesota. Last summer he spent several weeks at the Institute preparing several new text books for our course.

The many students and friends of Mr. Jansky will wish him a full measure of success in assuming his new responsibilities. The Institute is particularly happy in seeing this new recognition come to him. We're proud that we have had his very able assistance in shaping our course of Radio training. Students will also recall the appointment last fall of our former Employment Manager, Geo. Sutton, as Chief Technical Advisor to the Federal Radio Commission, all of which goes to show that the National Radio Institute, in securing the valuable services of these men, constantly endeavors to put the very best brains in the country into its system of training.



Graduate Herenchak on the job repairing a set. Notice how he has displayed his diploma—it means a lot to him as it does to every N. R. I. man, for it signifies ability and skill in the profitable science of Radio.



Designing Small Transformers

By
J. A. DOWIE
 Chief
 Instructor

There are many instances where the work of a Radio-Trician would be greatly facilitated were it within his capacity to design and build or re-build small transformers. The transformer is an important device—it operates only from a current that provides the fluctuating magnetic field that is necessary for its functioning. Step-up transformers have an output potential in excess of the line voltage from which they are operated. Such transformers are used to supply high voltage for receiving plate voltages, through rectification. The step-down transformer gives a reduced voltage which has a wide use for battery charging, bell ringing and filament lighting.

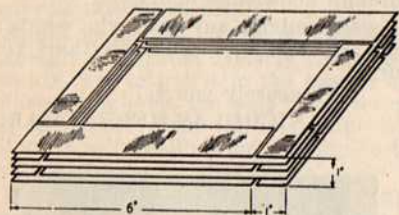


Fig. 1—The simplest way of building up a core for small transformers.

It is not very difficult to build a transformer for any of these purposes or to redesign and alter a transformer, adapting its purpose other than for which it was originally made.

The usual transformer consists of two windings, a primary and a secondary wound on a core. Figure 1 shows the manner of building up a core type of transformer. The cores are made from strips of magnetic metal. This is the most practical design of small transformers for the home construction.

The voltage of the secondary varies directly with the ratio of the number of secondary turns over the number of primary turns. If the secondary has twice as many turns as the primary, its voltage will be double that applied to the

latter winding. Stated in a formula, the required number of secondary turns for a desired voltage will always equal

$$\frac{NP \times ES}{EP}$$

where NP is the number of primary turns
 ES is the desired secondary voltage
 EP is the voltage applied to the primary.

Considering that the characteristics of the secondary will be determined by the number of turns on the transformer primary, the logical and first consideration in transformer design is to determine the proper number of turns for the primary.

Various considerations determine the correct amount of winding, such as the voltage, the quality of core iron, or steel (the flux density) and the frequency of the current. It is all summed up in the following formula:

$$N = \frac{100,000,000 \times E}{4.44 \times F \times B \times A}$$

Where N = the correct number of primary turns

E = the applied voltage (usually 110)

F = frequency of the supply line (generally 60 cycles, but quite often 25 and 40 cycles)

A = cross section area of the core in square inches (the width of the winding leg x height)

B = flux density of the core material and is measured in Maxwell's or lines of force per square inch.

The flux density will vary with different grades of steel and iron. Ordinary sheet iron may be calculated as having a flux density of 33,000 lines; transformer steel, 40,000; and the flux density of some special magnetic grade between 40,000 and 50,000. If you are rebuilding

a commercial transformer, you may assume a flux density of 40,000 lines.

At first glance this may seem a little complicated. However, if you read over this article carefully, you will find it very simple and the formulas used are easily applied to any problem you may be called upon to solve.

For example: Suppose you desire to build a step-up transformer for use with a B battery substitute. A maximum plate voltage of 240 is desired. Allowing for a drop of 200 volts across the rectifier and filter system, you will need

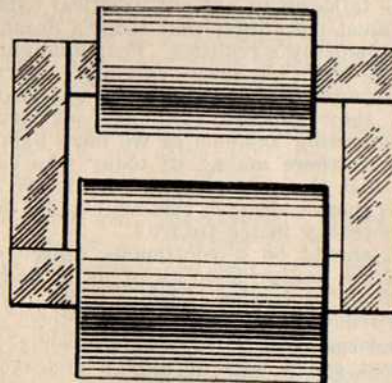


Fig. 2—Showing a good transformer design.

a transformer delivering 440 volts from the secondary. The transformer will be operated from a 110 volt, 25 cycle source. You now have several fundamental facts with which to work. They are—

$$\begin{aligned} EP &= 110 \\ F &= 25 \\ ES &= 440 \end{aligned}$$

We shall assume that you have procured a commercially built core of adequate size. It is built up of steel strips 2" wide, to a height of 2". This provides us with two additional facts, i. e.

$$\begin{aligned} A &= 4 \text{ square inches (2 x 2)} \\ B &= 40,000 \end{aligned}$$

We are now ready to substitute in the formula for N.— Doing so, we have

$$N = \frac{100,000,000 \times 110}{4.44 \times 25 \times 40,000 \times 4} = 620$$

This is the correct number of turns for the primary, or NP, and we may now substitute in the formula for the number of secondary turns, as follows:

$$NS = \frac{NP \times ES}{EP} = \frac{620 \times 440}{110} = 2,480$$

The sizes of the wires are not considered in these calculations. They are determined by the current they must carry. In the case of the transformer, we are designing, the primary should be capable of passing 1.2 amperes continuously without undue heating. The secondary should be similarly capable of delivering 50 milliamperes. The primary and secondary windings should be wound respectively with No. 20 and No. 32 wires. Larger sizes may, of course, be used, but they are unnecessary and add to bulk and expense.

Transformers must be adequately insulated for the potential which they must withstand. This applies equally to the separation of the individual windings and the insulation of the windings from the core. Long narrow cores should be avoided. They result in magnetic leakage and attenuation of the magnetic field. The winding legs of the core should be separated only far enough to provide sufficient space for the winding. The coils should be low and long, rather than high and short. Where it is convenient, the secondary may be wound over the primary with increased efficiency. In the cases of two secondaries, such as the filament lighting and charging secondaries on battery chargers, the secondary delivering the highest current should be wound over the primary. However, if it is more convenient, both secondaries may be wound on the leg opposite to the primary.

The primary and secondaries should be wound on forms that will fit closely over the core which is built up inside of the winding. When the four sides of the core have been fitted together, the iron strips should be clamped firmly, eliminating leakage and vibration, and at the same time permitting convenient mounting.

Success in Radio is invariably predicated upon fitness, based upon specialized knowledge. The advantage lies with a growing field because there intelligence and ingenuity produce the quickest reward, but that reward is open only to those peculiarly fitted by study and knowledge to meet its particular problems. (Excerpts from a recent Radio speech by Edgar H. Felix, an authority on Radio manufacturing and merchandising.)

Radio Looks Ahead

RADIO TO REPLACE GAS AS AUTO FUEL

Marmon Motors President
Prophesies Change
Within Century.

By the Associated Press.

CHICAGO, January 31.—Prediction that gasoline will be abandoned within the present century as fuel for automobiles in favor of radio-derived motor power was made here by G. Williams, president of the Marmon Motor Car Co., at the automobile show.

The automobile of the future, Williams prophesied, will be operated electrically through radio equipment, the power being furnished by central power stations. He declared that engineers are now considering plans for such automobiles.

"I can foresee with a reasonable degree of accuracy, each automobile owner being assigned a specific power reception designation or wave length and all that would be necessary for him to start his car would be to pull a switch on the instrument board," Williams said.

"These automobiles would be built in different horsepowers, their power receptions being controlled by rheostats, used similarly to the accelerators of today. A meter would be installed in each car so that its owner could pay at stated intervals for the amount of power actually used."

Elimination of moving parts and noxious gases, minimizing of maintenance costs, simplicity of operation and greater acceleration and deceleration, thereby speeding up traffic, will result from the radio cars, Williams predicted.

Read this interesting account that was recently sent throughout the country by the Associated Press. It shows what big men today think about the future of Radio. If automobiles in the future are to be propelled by Radio power, so will railway trains, ocean liners and huge air vessels.

While these great things that Mr. Williams talks about are not practical today we must not forget that today's dreams are tomorrow's realities. People laughed about the "horseless carriage" thirty years ago, and only eight or ten years ago they ridiculed the idea of huge broadcasting systems as we have today. Who is there among us today who can say that the very things that Mr. Williams speaks about in this article will not be a reality in the future?

It should be a continuous source of pleasure and pride to all of us in Radio that our profession is being called upon every day to apply Radio principles to new uses, and solve new problems in almost every field of human endeavor. Truly, Radio is gradually becoming one of the greatest constructive forces in the world.

Radio is playing a big part in rejuvenating the motion picture industry by supplying a voice for the heretofore silent screen, whereby our films may talk and sing. Few of us, however, realize that Radio is even extending its scope of usefulness into the field of geology, in which it is providing a scientific and rather positive means of locating mineral deposits by means of Radio waves. It is not generally known that high-frequency energy, produced by large vacuum tubes, is being employed in metallurgical work of the most delicate nature, in medical and surgical activities, in many manufacturing processes and in other ways. We do not, generally speaking, realize the extent to which Radio technique is being employed in wire communication, for the multiplexing of telephone and telegraph lines, in transmitting speech and music over telephone, electric light and high-power electric lines.

In talking pictures, the Radio-Trician finds a new field for applying his specialized training. All over the country, theatres, large and small, are being equipped with talking equipment. Here, then, is a promising field for those who understand amplifiers, loud-speakers, and vacuum tubes. And let me conclude with a plea for more interest in Radio technique and more men trained in Radio work, to the end that the progress of the art of Radio communication and allied fields may never want for the motive power of any industry—knowledge and training. (Excerpts from a recent Radio speech by Dr. Lee De Forest.)

Broadcasts to Help N. R. I. Men

Forty-two Stations In All Parts of Country
Now Putting N. R. I. Publicity On the Air.

STUDENTS and graduates will all be glad to learn of this latest arrangement to help N. R. I. men make 1929 one of the biggest Radio years in history. Never before have we been able to put so much stress on advertising the word "Radio-Trician" and to bring before the public at large the skilled ability and competency of N. R. I. trained men. This is one of the major steps in our general plan of wholesale advertising and publicity work for 1929.

Doubtless many of you have already listened in on some of these talks that are being broadcast over these different stations. They are being made at different times throughout the day—most of them after 5 p. m., and from the early reports already reaching us we are confident they are being heard by millions of people all over the country.

Now, many of these talks that are being made have been taken from the speeches of such men as Garside, C. Francis Jenkins, the inven-

tor; Raymond F. Yates, the television expert and Radio editor; DeForest and other Radio authorities.

Every N. R. I. man will find it worthwhile to listen in on as many of these speeches as possible. You will be repaid many times over in inviting your friends to tune in on these speeches. They will learn a lot of facts about Radio that will be interesting and helpful to them, and more than ever they will learn just what it means to be a Radio-Trician and how really competent and capable a Radio-Trician is to take care of their Radio needs.

So, while we are broadcasting here for you we want you to broadcast to the world that you are an N. R. I. man, too. Don't lose a chance to tell everybody that you are one of the "Radio-Tricians" being talked about on the air these days—that you are in the business yourself to make good in Radio. This should bring you some new Radio business.

Don't Forget

to send in your ideas
and plans for the
N. R. I. Contest. If
you haven't already
started writing
yours—see page 2
NOW and get busy.

The stations broadcasting N. R. I. talks are listed below:

KTUE.....Houston, Texas.
KFUM.....Maintou, Colorado.
WDBO.....Orlando, Florida.
WIP.....Philadelphia, Pa.
WFAN.....Philadelphia, Pa.
WHBC.....Canton, Ohio
KFAB.....Lincoln, Nebraska.
WQAM.....Miami, Florida.
WJBC.....Lasalle, Illinois.
WHBU.....Anderson, Indiana.
WRBL.....Columbus, Georgia.
WCAH.....Columbus, Ohio
WNRC.....Greensboro, N. C.
WOAX.....Trenton, N. J.
KFJL.....Astoria, Oregon
WGH.....Newport News, Va.
KPLA.....Los Angeles, Calif.
WKCR.....Cedar Rapids, Iowa
KXRO.....Aberdeen, Wash.
WNBF.....Binghamton, N. Y.

KXA.....Seattle, Wash
KGKB.....Goldthwaite, Texas
WNBO.....Washington, Pa.
WGBS.....New York, N. Y.
KFYR.....Bismark, N. D.
KGRS.....Amarillo, Texas
KGFV.....Revenna, Nebr.
KTAP.....San Antonio, Texas.
KDLR.....Devils Lake, North Dakota.
WOBU.....Charleston, West Virginia.
KFEQ.....St. Joseph, Missouri.
WMJ.....Newark, New Jersey.
WTAD.....Quincy, Illinois.
WRK.....Hamilton, Ohio.
KFXD.....Jerome, Idaho.
KZM.....Hayward, California.
KWWG.....Brownsville, Texas.
WEBR.....Buffalo, New York.
CJHS.....Saskatoon, Sask., Canada.
WMBS.....Harrisburg, Pa.
WIBS.....Elizabeth, New Jersey.

I don't think much of a man who is not wiser today than he was yesterday.

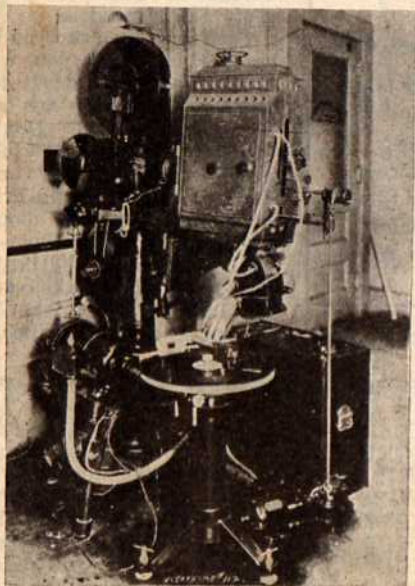
—Abraham Lincoln.

Radio Compass Again Plays Part in Thrilling Sea Rescue

Picture shows the heroic Captain George Fried, master of the S. S. America, standing by the insulated receiving coil of the Kolster Compass, which directed him to the distressed "Florida" by following the trail of the sinking ship's weak Radio signals. This Compass was also used in Captain Fried's rescue of the Antioe crew in 1926.

The receiving coil is enclosed within the drum affair shown here. It is entirely free to rotate even under most severe conditions of wind and waves.

The shaft on which the coil is supported extends through a suitable housing to the room in which the compass is located directly beneath the deck. There the readings are taken and the ship is able to steam on a straight line toward the sinking vessel.



The Field For "Land Ops" Is Growing

A new chapter in the story of belting the world with commercial Radio was written when Havana was recently linked to the United States by R. C. A.

This picture shows W. A. Winterbottom, traffic manager of the R. C. A., and Senor Victor Barranca of the Cuban Consulate General, N. Y., watching the first message from President Machado to President Coolidge come across on the direct circuit from Havana to New York.



Radio Helps the Movies

Radio must be given its full share of credit for putting "sound" into the movies. Principles of amplification, speaker mechanism, and transformers are embodied in the new sound apparatus that's being installed in theatres throughout the country. It is revolutionizing the industry and opening up new opportunities for men with Radio knowledge. This picture shows one of the new synchronized projectors. The sound is picked up from the record, carried to the stage and there amplified. In other types of apparatus the sound is converted from light rays from the film itself.

