

NATIONAL RADIO NEWS

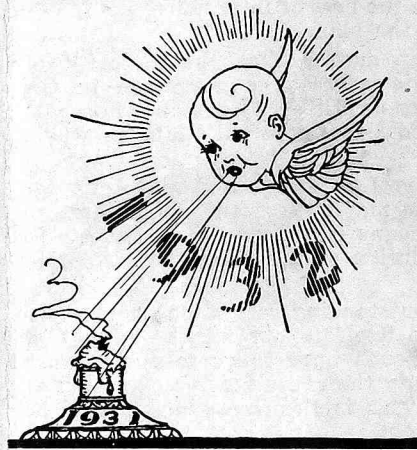


VOL. 4—NO. 6

WASHINGTON, D. C.

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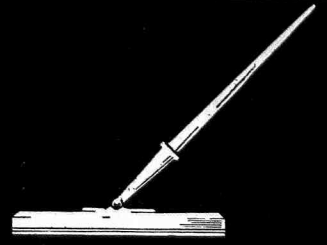
OUR WISH
is
that every
reader
of
*National Radio
News*



will be
HAPPY AND PROSPEROUS
during 1932

NEW YEAR NUMBER

My Own page



The ONE Resolution

AROUND the first of every year we make resolutions. We list dozens of things to do and not to do. We have the best of intentions to carry out the plan.

It does not matter that the majority of these resolutions are soon forgotten in the press of every-day life. The man who could remember and live up to all of them would be abnormal.

But, just as I have excused all of us for forgetting the majority of our resolutions, so do I condemn any man who cannot live up to his **One** resolution of the year, the resolution that counts.

This One outstanding resolution should continually force itself to our minds—in fact, it should be of such importance to our welfare that it is partly the cause for the exclusion of the others. This is the One which should be heeded and kept.

The man who cannot make and keep at least one resolution in the course of the year is not going to be any better off at the end of the year than he was at the beginning. And the fellow who cannot show some progress in the year just past must either check up on himself very quickly or give himself up as a bad job.

You may not be able to show an enormous bank account; you may not have bought a beautiful home. Conditions have not been at their best during the year just past, and everyone hasn't been able to do these things. But some men have been succeeding, which makes us wonder if possibly some of the others didn't fail to make their resolutions—or fell down on them, if they were ever made.

This year I'm going to make just **One** resolution. I'm going to **Work**—going to **Work** harder than I ever did before in my life. I'm working to help you fellows be successful. If you'll make your resolution correspond to mine, and we both keep our resolutions, something should certainly come of them, don't you think? . . . My resolution is **TO WORK!**



To My Partners

THE year 1931 has drawn to a close. We are launching on a brand New Year, 1932, with hopes and plans and renewed courage.

Many lessons were learned in the year just past—stern lessons some of them, but as the outlook is much brighter, we must forget all of the past—except to profit by our experiences, and look forward—always forward.

I must sincerely commend my large student and graduate family on their cooperation.

The graduates—I must praise for their spirit in increasing the Alumni membership practically three hundred per cent in 1931.

My thanks are also for the students and graduates who through their articles and ideas have helped make National Radio News a success.

And you men who have stuck by your guns and fought, studied, when things were not going so good—plugged on to the success goal you set for yourself—my commendation is for you. You are not only working for your own success, and the welfare of those who do—or will depend on you. You are also setting a shining example for others—those with ambition but less will power than you possess.

To every last one of you—to your families and friends—A Prosperous New Year.

J. E. Smith

President.

Happy

RADIO'S ANSWER TO THE DEPRESSION

By T. E. Rose, Vocational Director

Depressions are something we have periodically; something we can't get away from. They appear to be natural reactions in the general economic scheme of the world.

Strange as it may seem, they do a lot of good, in a way, for business in general, by the lessons we learn from them. And following every major depression, we have a period of prosperity which surpasses its predecessor.

Various plans have been suggested and tried in an effort to speed up the return of prosperity. General opinion has it that we must get money into circulation, get people spending—promote employment by building and rebuilding. And the plan is good. It only remains to put these theories into practice to speed up the economic recovery.

Where does Radio fit into this scheme? We are proud to say that our industry is in the foreground. Radio and allied interests are so sure of the firm foundation of our general structure that they are launching various projects which promise to set all time records.

For instance, there is the development of Radio City, in New York. The capital required in this, the largest building project in the world's history, is \$250,000,000. No less business authorities than the Rockefeller interests are backing this project. The development will occupy three square blocks in the heart of New York City; devoted to electrical entertainment, including the most advanced type of broadcasting equipment and studios, and equipped with every device known for aural and visual broadcasting. Work is expected to be entirely finished by the fall of 1933.

Among other things, Radio City will include a sixty-six story office building with a sixteen-story wing, two six-story office buildings, a sunken plaza together with The International Music Hall, the world's largest theatre.

It is understood that leases have already been signed by the National Broadcasting Company which will give them space on the first twelve floors of the main sixty-six story



building, including twenty-seven broadcast studios. It all boils itself down to the point that the Radio Industry has confidence in itself and in its future; so much confidence, in fact, that they are willing to spend money to make money. They are willing to go out after business which they know will be good in the future.

And it is interesting to note that while various industries have been deploring business conditions, the Columbia Broadcasting System reports an increase of 46 per cent in commercial broadcasting for the first six months of 1931, over the first six months of 1930.

There is a lot of truth in the statement made by Mr. Powell Crosley, Jr., President of the Crosley Radio Corporation:

"It is normal for people to work for what they get. It behooves all of us—those in Radio in particular—to forget that there was a time when people mobbed Radio stores to buy Radio apparatus, and, instead, to get out and work for business."

Because after all—no matter how much money is invested—no matter how many people are put to work, unless somebody gets out and plugs—gets right in and digs for business, the economic situation is going to be just as bad or worse than it was heretofore.

The men in Radio who are promoting the various progressive plans deserve a lot of credit. But after all, they are merely expressing financially the confidence all of us feel in our Industry. There's no use crying over depression—the only way is to fight it with the tools of prosperity.

The Alumni Association hopes to have some interesting figures for the February issue of National Radio News.

They will cover the number of Radio receivers in each State in the Union.

Watch for these important figures.



A Chat With the N. R. I. Director

WHEN you're selling a product, be it Radio or ash cans, you'll run into a class of people who have developed what they term "Salesman Stoppers."

These are nothing more than excuses to end an interview and delay matters—something the average salesman discourages. Every procrastination necessitates at least one more call before the order may be secured.

"I want to talk it over with my husband (or wife) before deciding" is just such an excuse. Make an extra effort to be present when they do "talk it over." There will be some points the prospects will overlook if the salesman is not there to guide their decision. All too frequently the husband or wife has heard that the "Blank" Radio is less expensive. And the decision will remain in favor of "Blank" if you are not on hand to prove differently.

How would you handle, "It's wonderful, but too expensive"? That customer wants to be sold—he wants you to justify, by explanations of mechanical perfection, low operating cost and ease of operation, his expenditure of cash. He is easy to sell. He is in a different class from the prospect who says point blank, "It costs too much," and has not been impressed by any features of the product. Switch to a lower priced line with this fellow.

"I'm not ready to buy yet; I'm just getting prices." This usually means, "How long can I have to pay for it?" The inquirer knows very well that prices obtained today may vary twenty per cent by next week. Talk terms to that fellow and you'll get him.

Exercise caution in the use of "cheap" and "inexpensive." "Cheap" has a rasping sound and indicates small value.

When a prospect decides to see the products of other concerns, do not knock them. The less said about a competitor's product, the better. Talk about your own merchandise.

Most fellows selling Radios find it necessary to do some canvassing. Watch your "callbacks" on homes where folks are continually "out." Night is the time. In lots of cases all members of the household are employed during the day. They have little time to shop, and have plenty of money to buy. Night callbacks on "outs" produce a volume of fairly easy sales.

Many salesmen talk too much. They never seem to sense when the customer is sold and ready to sign on the dotted line.

MARK TWAIN went to church one Sunday and heard a missionary talk.

In his report of the address he lays convincing emphasis on the importance of knowing when to stop. "He was the most eloquent orator I ever listened to," writes Mark Twain. "He painted the benighted condition of the heathen so clearly that my deepest passion was aroused. I resolved to break a life-long habit and contribute a dollar to teach the gospel to my benighted brethren. As the speaker proceeded, I decided to make it five dollars, and then ten.

"Finally I knew it to be my duty to give to the cause all the cash I had with me—twenty dollars. The pleading of the orator wrought upon me still further and I decided not only to give all the cash I had with me, but to borrow twenty dollars from my friend who sat by my side. That was the time to take up the collection.

"However, the speaker proceeded and I finally dropped asleep. When the usher awoke me with the collection plate, I not only refused to contribute, but am ashamed to say that I actually stole fifteen cents!"

Don't over-sell.

RADIO-TRICIAN SERVICE SHEET

REG. U. S.

PAT. OFF.



COMPILED SOLELY FOR

STUDENTS & GRADUATES

CROSLY MODEL 122

ALIGNMENT OF TUNING CONDENSERS

(Also for Chassis 123 and 124)

The alignment of the tuning condensers is a process requiring considerable skill, and should only be undertaken when absolutely necessary, and only by those who have had extensive servicing experience. While station signals can be used for aligning, it is advised that a local modulated oscillator be employed. The procedure for aligning the tuning condensers is as follows:

1. Tune to a signal between 1300 and 1400 kilocycles.

2. Turn the volume control all of the way on. If all signals within the required range are too loud, connect a 0.00025 m.f. fixed condenser between the "A" and "G" terminals, and then couple the antenna very loosely to a wire connected to the "A" terminal.

3. If, when carefully tuned to the middle of the band, the dial reading does not correspond to the frequency of the signal, but is not more than two channels off, set the dial at the correct frequency, and adjust the padding condenser on the oscillator tuning condenser (the tuning condenser nearest the front of the chassis) until the signal is loudest. Check the tuning by re-adjusting the station selector. It may not be possible to regulate the oscillator padding condenser so that the oscillator condenser is properly aligned with the exact dial setting, in which case align the padding condenser with a dial setting as close to the actual frequency as practicable.

4. After aligning the oscillator padding condenser, re-tune to a frequency between 1300 and 1400 kilocycles and carefully adjust the padding condensers on the other two tuning condensers until the signal is received with greatest volume.

5. If a screwdriver of insulating material is not available, adjustment may be made with an ordinary screwdriver by turning the screw slightly, removing the screwdriver, and re-tuning—repeat-

ing this process (being sure to turn the screw in such a direction that the tuning approaches more nearly the desired frequency, of course) until the dial setting agrees with, or approximates, the actual signal frequency.

ALIGNING INTERMEDIATE FREQUENCY STAGES

For Chassis Nos. 122, 123 and 124

The primary and secondary circuits of the intermediate amplifier transformer must be tuned accurately to 175 kilocycles. They are aligned carefully at the factory, and no change should be necessary. In order to align them, an accurately tuned local oscillator operating at 175 kilocycles is essential. The procedure is as follows:

1. A local oscillator tuned accurately to 175 kilocycles frequency is required.

2. Remove the oscillator tube from the chassis. Remove the clip wire from the first detector tube. Connect the test oscillator output from the first detector grid to ground, and adjust the two screws at either side of the front I. F. coil for maximum reading on the output meter. Always re-align the tuning condenser after aligning the I. F. amplifier.

CHANGES IN MODEL 122

The following changes as compared with the circuit diagram shown herein will be found in some chassis.

1. The pentode grid resistor is 300,000 ohms instead of 1 megohm as shown on the diagram.

2. The volume control resistor is 650 ohms instead of 2500 ohms, as shown.

3. The 3000 ohm resistor shown on the diagram just to the left and above the power transformer is changed to 1790 ohms.

4. The 1100 ohm resistor shunted across a portion of the volume control is deleted.

5. The 25,000 ohm resistor in the r. f. screen grid circuit is replaced by a 20,000 ohm resistor.

Diagrams for chassis 123 and 124 will be found on pages eleven and twelve of this issue.

Readers who file Service Data in separate binders remove page carefully; trim on dotted line for same size as Data published heretofore.

Voltage Limits

Filament Voltages

All tubes but rectifier	2.3 to 2.5
Rectifier tube	4.6 to 5.0

Screen Grid Voltages

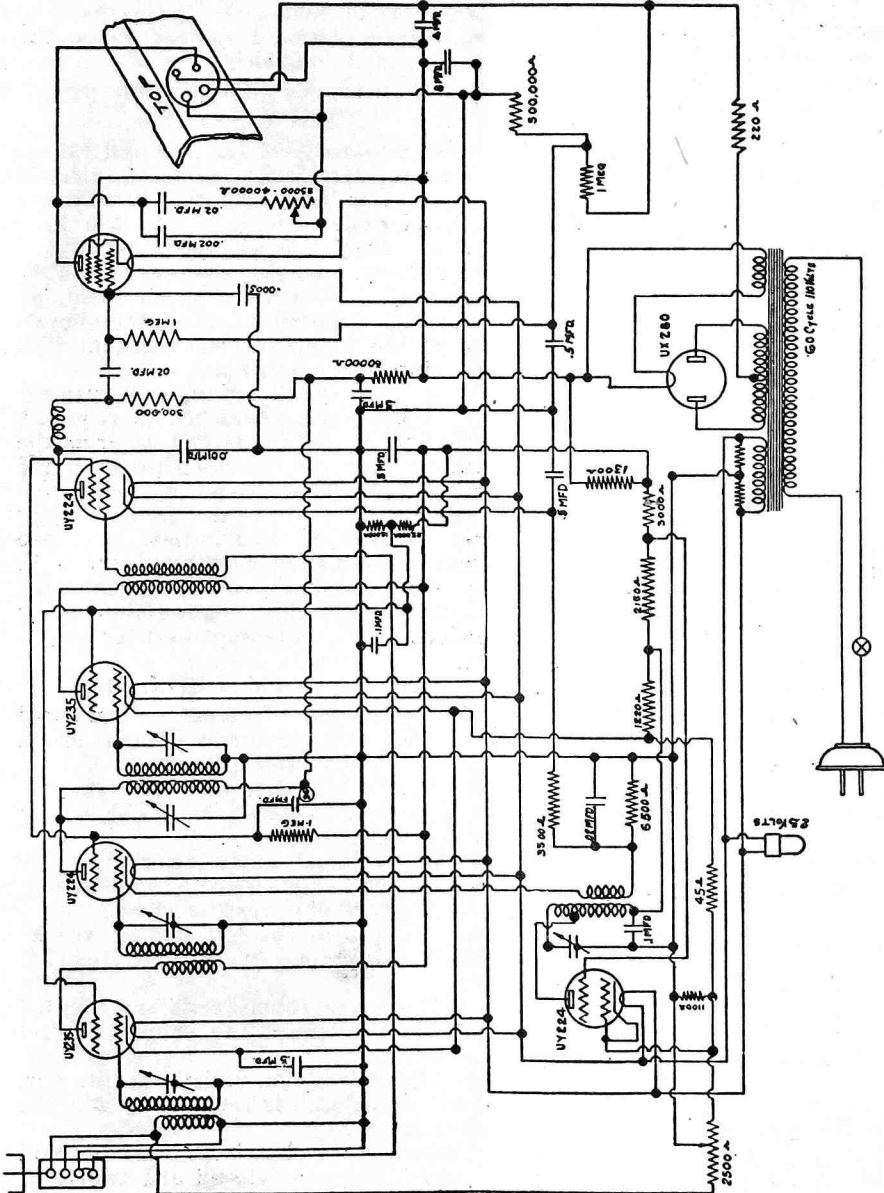
1st R. F. and Intermediate Amplifiers	45 to 55
1st Detector and 2nd Detector	60 to 80
Oscillator	80 to 100
Output	260 to 300

Plate Voltages

1st R. F. and Intermediate Amplifiers	170 to 200
Oscillator	28 to 38
1st Detector and 2nd Detector	185 to 215
Output	260 to 300
Rectifier (A. C. voltage)	280 to 320
	each plate

Control Grid Voltages

1st R. F. and Intermediate Amplifiers	1.5 to 2.5
1st Detector	6.0 to 8.0
2nd Detector	8.0 to 10.0
Output tube	18.0 to 22.0



NATIONAL RADIO NEWS



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J. E. SMITH, President. E. R. HAAS, Director.
The Official Organ of the N. R. I. Alumni Association

STUDIES AMERICAN SYSTEMS

Editor interviews graduate who is 10,000 miles from home.

We had a fine opportunity to get some first-hand information on Radio conditions in the Orient not so long ago.

The quiet, unassuming young man who was shown into our office introduced himself as C. S. Mao, of Shanghai, China, and points East.

Quite naturally we wanted to know why he was so far from home, and sensing a story we sharpened up our editorial pencil and prepared to listen.

Mao, who is a graduate of Nan Yang University of Shanghai, became interested in Radio about four years ago.

To increase his knowledge of the technical side of the profession, he enrolled with N. R. I. and graduated.

Then his big chance came. He was sent by his government to the United States for two years to study Radio and phone systems in this country.

He finds the broadcasting situation here quite different from that in China. There, instead of privately owned stations operated for profit by advertising programs, etc., the

stations are provincially owned and operated.

Each of the twenty-one provinces has authority to operate one station. Quite a bit of their Radio is on short wave, which they consider most economical.

The first year he attended one of our finest universities, taking post-graduate work in Electrical Communication and obtaining a degree of M. S.

In rapid-fire order came short periods of association with organizations manufacturing, assembling, installing, various types of Automatic Telephone and Telegraph equipment, Radio Receivers and Transmitters.

Returning to China, Mao thinks seriously of starting in the Radio Business for himself as soon as he has completed his contract with his government.

He is favorably impressed with the Radio system and outlook for Radio's future in this country and looks for Television to make a permanent place for itself shortly in the American home.

Opportunity only had to knock once at this young man's door. He was ready for it. Good luck, Mao. We hope you enjoyed your stay in America.



Graduate C. S. Mao, photographed while in this country studying American systems.

A LINK in a STRONG CHAIN

IN considering the important factors in the success of any Radio-Trician, it is well to take into account the qualities which he may possess as compared with the requirements for positions, as set forth by the employer.

With that in mind, let us analyze some of the records which we have obtained from the N. R. I. Employment Department. Let's see just what the employers wanted when they wrote to N. R. I. asking for recommendations of Radio-Tricians.

It appears, from our study of these records that the most important qualifications are Training, Personality, and Application.

It goes without question that the employers who make use of the N. R. I. Employment Service consider TRAINING as the most important qualification; otherwise, they would go to the various employment agencies or use the help-wanted columns of the newspapers more than they do. They realize, that regardless of what other important and valuable qualities the Radio man may have—if he is lacking in that training background—if he must depend too much upon snap judgment instead of sound theory—he is too apt to be like a house of sand built upon a beach. The first wave of difficulty may break him down. He is not stable.

From our information it is difficult to say which of the other two are more important,

the quality of PERSONALITY or that of APPLICATION.

Both of these cover quite a bit of ground—embrace a number of items which are important in themselves because they combine to form a whole which may either make or break the Radio man.

For instance, under Personality, we could list Appearance, Courtesy, Neatness of Work, Manner of Speech; while under Application, which in reality is just a large subdivision of Personality, could be mentioned Initiative, Stick-to-it-ive-ness and a number of other important items.

What does the employer mean when he asks us to recommend to him a man with Training, Personality, and the quality of Application?

First, he means that he wants a man who has had the interest in his future to enroll for a course of training which will carry him toward the goal he has set. A man who has not let himself become discour-

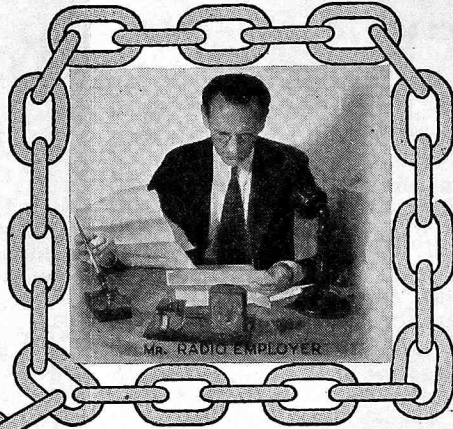
aged if the going was rough at times. He means a fellow who has studied and completed this Course of training and has advanced to the point of starting on the actual work-day road to Success.

Second, he desires that the man have the qualification of Personality, which will enable him to handle the employer's customers and prospects in the same manner that the employer himself would handle them if he could be in the field on each and every call. He must be pleasant, he must be a diplomat. He is the direct rep-



N.R.I. EMPLOYMENT OFFICE

representative of his firm while he is in the home, or working on a job for that customer. In many cases the service man, the Radio-Trician, is the only contact the business house ever has with the customer after the sale is made. The employer wants that customer's continued business and it is up to the Radio-Trician, in justice to himself and to his firm, to see that the customer's Service Work is kept and the customer himself sold on the organization, as represented by the Radio-Trician. So well sold, in fact, that when he is ready to purchase additional Radio equipment, he will natu-



ally look to the organization as the logical place to do business. The efficient Radio Service Man, the man with the qualifications we are discussing, can make the selling job a much easier and less expensive one.

Third, we come to the quality of Application. This is one of the most important, because it is one by which the Institute can judge its graduates—upon which it may base recommendations, and one which is all-important to the employer. Now this employer realizes the problems of the industry and the problems which confront the man being trained in Radio. The Institute has done a lot to make known to these employers our method of teaching, not by text books alone, but by practical units of work. N. R. I. does not hesitate to make its point clear to the employers that it does not believe it possible to train men for Radio, by the correspondence method or otherwise, without the aid of practical work.

Employers further realize that there is an unlimited possibility for the independent Radio-Trician to do spare-time Radio work while taking his training, for the additional experience which he obtains. Not only does he get experience in handling the actual Radio repairs, but also experience in meeting people, something he will be required to do

when he graduates and is employed in a Radio capacity. The employer knows that N. R. I. advocates the handling of such spare-time work.

It is easy to see, therefore, the necessity of getting all the spare-time Radio work which can possibly be obtained. In addition to the earnings from these jobs, the experience will go a long way in helping to secure future Radio connections. And it proves your quality of Application—both to N. R. I. and the employer.

Since the Training feature comes to every student of the Institute automatically, there remain the two qualifications of Personality and Application to be considered. The handling of spare-time Radio work can give training in actual Radio work, training in Personality and since it supplies the Application qualification—SPARE-TIME RADIO WORK forms one of the most important links in the chain between the N. R. I. Employment Department and your future Employer.

This employer is the man who will eventually pay your salary. He is the man who says what you shall know and what you shall be if you are to work for him. He is the big boss—the fellow who must be satisfied. You have the opportunity to do that and make money at the same time. Get That Spare-Time Radio Work!

It may be well to consider the ideas of members of the N. R. I. staff, men who are directly responsible for seeing that you get the best and most out of your Radio Training.

"The man who goes after spare-time Radio work is usually a good student. The experience he obtains is very valuable. It gets him into actual Radio work more quickly and puts a punch behind his lesson work."—S. M. Armstrong, N. R. I. Student Service Director.

"The student who has the initiative to get out and get the business which is right there waiting for him in his own neighborhood goes a lot more rapidly with his studies than the fellow who overlooks the opportunity."—J. A. Dowie, Chief Instructor.

"Many a man who has come under my observation has started in the Radio business by picking up the spare-time Radio work which was literally on his door step. He builds up a list of customers who will stick by him and eventually he blooms out with a full-fledged Radio business which is very profitable."—J. Kaufman, Supervisor of Education.

Handy Device for Students

WHEN student J. C. Heuvel, of Oregon City, Oregon, started to work on the practical units of the N. R. I. Course, his inventive mind began to function and he set about to find better ways of doing things with his units.

He soon realized that in his experimental work it was necessary to be continually handling the apparatus, turning it this way and that, sideways, upside down, etc., in order to properly assemble the parts and make the various tests.

So he hit upon the idea of building a rack, or support for the material, which would allow free turning and easy access to bottom, top, or side.

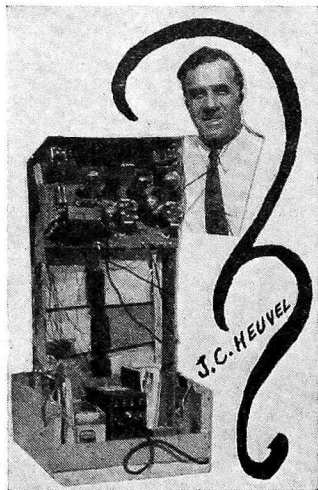
He got an old wooden box, the length of which was approximately the same as the length of the unit baseboard. Into this box goes his eliminator (or batteries). In an upright position, secured to the sides of the box, are two wooden strips, with holes at various intervals along their length.

A hole is then drilled on each side of the sub-panel brackets on the experimental set. The set may then be swung into position at any height desirable on the upright supports, by means of two stove bolts, which may be procured at any hardware store for a few cents.

With this simple apparatus, it is possible to work on the experimental units, either sitting down, or standing. The bolts should be so

fastened t h a t they allow free turning of the set, but they should be tight enough that the hands are free for work without holding the set for support.

Arrangements can be made for carrying hook-up wires up the supports, from the power supply in the box below. Here's a picture of student Heuvel and his outfit.



Did We Ask You to Enroll Again?

By S. M. Armstrong
Student Service Director



AFTER you enrolled with N. R. I., did you ever get literature asking if you were interested in N. R. I. training, and again, advising you to enroll?

You have possibly received such literature—and you may get more. So let me explain how this happens.

First. Some N. R. I. student, who does not know that you are already a member of N. R. I., may send in your name as a prospective student. Your name may even be sent to us by some fellow you do not know personally.

Second. Manufacturers and distributors of Radio apparatus and accessories frequently supply us with names of their customers, believing that these customers might be interested in the N. R. I. Course. We naturally write to each man whose name we receive.

Whenever you buy Radio apparatus, it is possible that we may later receive your name as a prospective student.

Now that you understand how it happens, I feel pretty sure that you won't mind if you occasionally get "sales literature" from us. Of course, we could check our files with the name of every prospective student we receive, and prevent this literature from going out to you. But this would take time that we'd rather use in giving you the very best of service on the THINGS THAT REALLY COUNT—your lessons!

So if you ever get a "sales letter" from N. R. I., don't bother to write us. Just note your name and student number on the "sales letter" and return it to me—then I'll see that the matter is properly handled.

Thanks for your cooperation!

RADIO-TRICIAN SERVICE SHEET

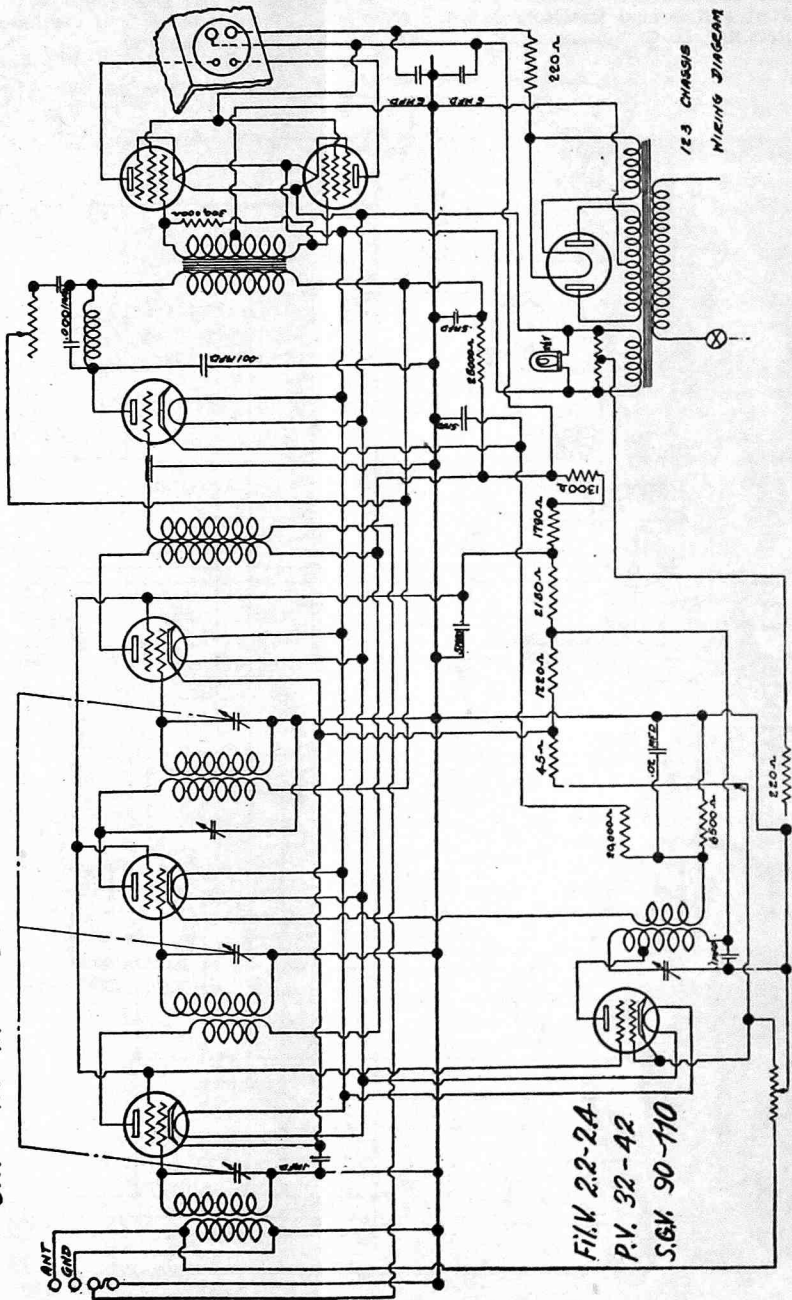
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COMPILED SOLELY FOR STUDENTS & GRADUATES




CROSLY CHASSIS NO. 123

- Fi.V. 2.2-2.4
- P.V. 215-245
- S.G.V. 90-110
- G.V. 1.5-2.5
- Fi.V. 2.2-2.4
- P.V. 170-190
- S.G.V. 80-100
- G.V. 7-9
- Fi.V. 2.2-2.4
- P.V. 215-245
- S.G.V. 90-110
- G.V. 1.5-2.5
- Fi.V. 2.2-2.4
- P.V. 160-180
- G.V. 18-22
- Fi.V. 2.3-2.6
- P.V. 190-230
- S.G.V. 200-240
- G.V. 13-16



Fi.V. 2.2-2.4
P.V. 32-42
S.G.V. 90-110

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N.R.A. ALUMNI News

What Shall We Do With 1932?

The country looks forward to the next twelve months, anticipating the settlement of a number of questions of great importance.

Plans for the return of prosperity; the employment situation; prohibition, and its effect on employment and taxation; Naval reduction; immigration; all will come in for a big share of publicity.

These items will be among the major questions arising in connection with the Democratic and Republican National Conventions, and later in the National Elections. They are assured of public interest.

While, like everyone else, we're concerned with the political and economic aspects of these questions, we're more directly interested in the fact that, as items of paramount public interest, they will form the basis, collectively and individually, of Nation-wide Radio Programs.

If we, as Radio men, would commercialize on the popularity and importance of these questions, we must plan ahead. We must stimulate the interest of our customers, by advertising and by personal solicitations, well in advance. The fellow without a Radio must be sold; the owner of a set must be either resold or his apparatus serviced.

When a customer spends money he is promoting prosperity's return. Let's get behind this 1932 plan and push—it means money in our pockets and the decline of depression.

Adapting Receivers to Use Variable Mu and Pentode Tubes

By F. L. Sprayberry

We wish to thank Mr. Sprayberry, N. E. I. Consultant on Servicing, for his willingness to assist the Alumni Association, as evidenced by the following article which he has written for us.



The variable mu tube is nothing more than an improved '24 type screen grid tube. Its advantages over the '24 type are that cross-talk and cross-modulation are eliminated. Its practical advantage is that local-distortion switches and complicated antenna circuits are not necessary.

One great trouble with the '24 tube was that, due to the low control grid bias (1.5 to 3 volts), detection was easily possible in the first or second R. F. tubes. A strong local signal would then ride in on the carrier wave of the station tuned in. This local signal was then amplified through the receiver along with the signal to which the receiver was tuned.

It was the tube engineers' problem to develop a tube having a slow plate current cutoff characteristic, that is, a tube, the straight portion of whose $E_g - I_p$ curve would be longer than that of the '24 tube. The result of their

(Next page, please)



F. L. SPRAYBERRY

Variable Mu and Pentode Tubes

(From page 13)

work was the variable mu tube, which will take a control grid bias of about 50 volts before the plate current is cut off. A 6 to 10 volt bias on the '24 tube would cut off its plate current. Therefore, it would not take a very strong signal to force it to operate on the knee or bend of its curve where detection is obtained on all tubes.

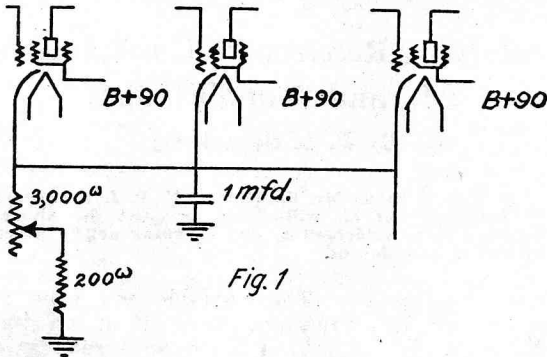


Fig. 1

Improved operation in all receivers of the T. R. F. type using the '24 tube can be obtained by rewiring the circuit to use the variable mu tube.

Such receivers usually have a variable screen grid voltage, although there are some sets which employ a variable control grid bias. In either case, the volume is controlled by the variable unit. To use the variable mu tube, the control grid bias must be variable. The screen grid voltage should be constant at 90 volts when the control grid bias is at a minimum. Therefore, it will probably be necessary to change the screen grid voltage resistor of the voltage divider. Usually a 150,000 ohm resistor between voltage divider and screen grid leads will be sufficient to reduce the voltage to the proper value. However, you may have to experiment to find the value of resistor to reduce the voltage to approximately 90 volts.

No change is necessary in the detector circuit even though it uses a '24 tube. The variable mu does not make a good detector.

The usual set uses four '24 tubes, three as R. F. tubes and one as a detector. Remove all cathode wiring of the three R. F. tubes and rearrange the circuit as in Fig. 1. The parts required for the change are a 1 mfd. con-

denser, a 3000 ohm variable resistor, and a 200 ohm fixed resistor. If only two R. F. tubes are used, the fixed resistor may be changed to one having a value of 300 to 350 ohms.

If the grid returns of the R. F. tubes are not directly grounded, change the circuit so that they will be grounded.

When the cathode circuits and screen grid circuits have been changed as directed, you are ready to use the variable mu tubes. Either the '51 or '35 tube may be used.

Pentode tubes can be substituted for the '45 type tube. Fairly good results may be obtained without changing the output transformer. However, for best results an output transformer designed for '47 tubes should be used. The secondary of the output transformer should be designed to match the impedance of the voice coil of the dynamic speaker.

Most speaker manufacturers are now making output transformers which match the plate impedance of the pentode and the voice coil of the older type speaker.

Several mail order firms also list suitable transformers in their catalogs. Two such companies are the Wholesale Radio Service Company, 38 Vesey Street, New York City, and the Federated Purchaser, 25 Park Place, New York City.

Pentode tubes require five hole sockets. The plate, grid, and filament connections should be connected to corresponding connections on the

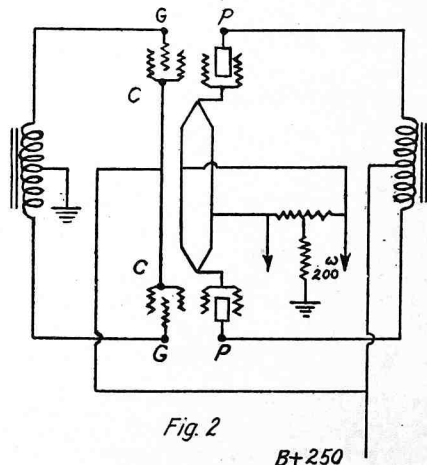


Fig. 2

B+250

(Page 16, please)

The meeting place for Radio-Tricians



"Tell it in The Mailbag"

Tom McMullen, Oshawa, Canada

I would like to let you know how I enjoy National Radio News. I like it fine. Maybe the fellow who suggested getting rid of The Mailbag has gotten over his indignation by now. Very probably, if you were to ask him his views on the matter now, they would be reversed entirely. I think The Mailbag is O. K. The little tips I see I always jot down and think they may be useful some day.

William C. Spencer, Rochester, New York, states that in one week he made \$300 clear with his Radio work.

Irving Iskourtz, New York

Many of the new midget sets use shielded wire in the plate and sometimes control grid and find that the wire shorts very easily. When it is in the control grid lead, there will be a grid bias on the tube when the wire is shorted. It is advisable when all voltages are correct to look for a shorted shielded wire in the control grid leads.

Rob Davies, Notch-Hill, Canada

In servicing the new two volt receivers (battery), I find the most trouble in the filament rheostats. When the old batteries were used, the set worked O. K., but when new batteries were installed, I got nothing but noise. It looked like battery trouble, but I found the wire-wound rheostat needed cleaning. Some fine sandpaper and a little effort soon cleared up the trouble.

Old Phil Philosopher says, "The biggest fool is the man who fools himself."

W. A. Bunch, Goldsboro, North Carolina

"Depression?" That word means nothing to me now. I have had much more than I could do for the past month.

Things are coming my way all right now. People bring their sets to me from the country and other nearby towns and here is a big something else: I do not solicit or advertise any at all.

The good work I do (and guarantee) is bringing me all I can handle. Thanks to you and all N. R. I.

Otis Wright, Pocahontas, Tennessee

Just a hint that may help some of the fellows in servicing the Crosley No. 21 Battery Receivers. When there seems to be a leaky first stage A. F. T., be sure to look for a leaky choke which is in series with the primary winding or in the detector plate circuit, as this may be the source of trouble.

J. K. Jones, Iliff, Colorado

The National Radio Institute Alumni Association was the best thing that could be added to an already perfect organization. More power to N. R. I., the Association, and the News.

N. T. Black, Portsmouth, Ohio

I have made enough in Radio to pay for my Course several times, and am getting along fine.

Here is one for The Mailbag on the Majestic models 72 to 92. If the set works for a while and then stops and when shut off and turned on again and is O. K., renew the tube in the second R. F. stage and the set will work O. K. I have found this to be true on several of these models. Most of my work is on this type of receiver and I find the filament opens up on this tube very frequently, although the set tests O. K.

When things look darkest the far-sighted man prepares for a brighter future.

T. R. Morris, Colorado, Texas

I ran into some Earl sets on which I had no data. The complaint was "poor reception." The position of the balancing condensers led me to think they were across the tuning condensers. I decided the trouble was in bad alignment of these.

I tried to line-up a couple of the sets, with no luck. Then I dug deeper and soon found I was working on a NEUTRODYNE circuit. In a few minutes had her "perk-ing" like a charm.

No trouble to see the moral of this little tale. If you have nothing to tell you what you are working on, take time to find out before you start "fixing" things.

Everything is Super-Heterodyne these days. Be sure you are not messing up the I. F. stages instead of aliening tuning condensers.

Herbert Raquet, Indianapolis

I am in charge of the Service Department of the Krue Radio & Electric Shop of this city.

Here is a service hint on the Peerless Curior Model 65, using the Kyletron speaker.

When the set voltages all check O. K. and you can't understand anything in the speaker, the fault is a broken down condenser connected on the plate of one of the 45 tubes and to the output of the audio transformer, while the other end connects to the speaker and to a ¼ meg. resistor connected to the speaker voltage rectifier tube (A-199 tube).

This condenser is placed in with the Audio transformer enclosed in a can, mounted on top of the chassis. It is a .5 mf. 1000 volt condenser. It can be pulled out of the can and replaced with any .5 mf. 1000 volt condenser.

Variable Mu and Pentode Tubes

(From page 14)

sockets. The cathode terminal is the screen grid terminal for the pentode, and should connect to the same B+ voltage that feeds the plate.

The grid bias resistor should be 200 ohms for two tubes or 400 ohms for a single tube.

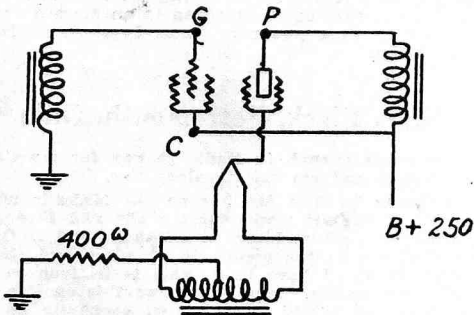


Fig. 3

The suppressor grid of the pentode is connected internally to the center of the filament, and you will not have to bother about this connection. Fig. 2 shows how the circuit should be arranged for push-pull tubes. Fig. 3 shows the circuit for a single tube.



Meet student Walker, fellows. His full name is William Walker, and he gets his mail at Hilo, Hawaii.

We wish we had space to reproduce here the fine pictures he sent us of the beautiful island on which he lives. Maybe we'll have the chance some time later.

Although he is still a very young man, he holds down a responsible position with the local telephone company.

IMPORTANT NOTICE

Due to the many changes we have to make from time to time in keeping our training right up to date it is essential that you put at the top of each lesson you send in for grading the proper Lesson Number.

For example: If the lesson is numbered "10-3"—put "10-3" on your papers. If it is "32FRI," put "32FRI" not "32FR."

If you always follow these simple rules you'll be sure to receive the correct model answers with your returned graded lesson.

S. M. ARMSTRONG,
Student Service Director.

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