

"The Electric Circuit" Explained for Beginners by Prof. D. P. Moreton;
Wiring Directions for Four Filter Super-Het; Audio Frequency Amplifiers

Radio Digest

EVERY WEEK **Illustrated** PROGRAMS **TEN CENTS**

REG. U. S. PAT. OFF. & DOM. OF CANADA

Vol. XII

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SATURDAY, APRIL 4, 1925

No. 13

TRAIN CONTROL BY RADIO

RADIO AID AS DEATH STALKS IN ILLINOIS

STATIONS RISE TO EMERGENCY OF CYCLONE

Broadcasters Prove Value—Raise Relief Fund, Collect Clothing and Disseminate News of Twister

CHICAGO.—When a terrific tornado swept the southern part of Illinois and Indiana, causing a gigantic loss of life and property, broadcast stations of this and other cities demonstrated their ability to help in an emergency by sending out appeals for money and clothing. Fans throughout the country responded nobly, and as a result much grief and misery was obliterated.

Thousands of dollars were contributed and many stations gave special programs for the benefit of the sufferers. Notably among these was WLS, the Sears-Roebuck station here.

When the call came through to rush doctors, nurses and volunteer workers to the scene, George Hay, the "Solemn Old

(Continued on page 2)

Glaiborne Foster, beautiful star of "Apple-auce," pleased Radio listeners a gain from WGN recently. Photo by Drake Photo Studio.



Virginia Flohr, young dramatic soprano heard often over KFIS microphone, reflects all the beauty of southern California in her eyes and voice. Right, Laura Hope Crews, lead in "Ariadne," was interviewed recently at WGBS, New York, by Teresa Rose Nagel.



NO ENGINEER NEEDED WITH NEW SCHEME

Starts or Stops at Will

G. Y. Allen Tells of Automatic and Radio Control for Crewless Electric Trains

NEW YORK.—"Through the use of modern developments in Radio, it is entirely possible to operate electric trains from a central control office," said G. Y. Allen of the Radio department of the Westinghouse Electric and Manufacturing company in discussing the subject of "Railroad Radio" recently before the New York Railroad club.

"I do not wish to be understood as advocating the elimination of the motorman, conductor, and crew, for no mechanical device, however perfect, can take the place of human intelligence," continued Mr. Allen, "but it is interesting to note some of the possibilities of Radio control.

Operation Entirely Feasible

"It is now entirely feasible, through combination of automatic control and Radio supervisory control, to start a train without a crew from a station, run it at full speed over clear tracks, slow it down or stop it, in accordance with the signals of an automatic block signalling system, start it up again, when the signals clear, stop it at its next station stop, and open its doors," said Mr. Allen.

(Continued on page 2)

No. 2 OFFICIAL BALLOT

Announcers' Contest

RADIO DIGEST SECOND ANNUAL GOLD CUP AWARD

Gold Cup Award Editor, Radio Digest,
510 North Dearborn St., Chicago, Ill.

Please credit this ballot as one vote for:

.....of Station.....
(Announcer's name) (Call letters)

Signed.....

Address.....

City.....State.....

If you desire, tell below in five or less words what you most like about the announcer for whom you have cast this ballot:

4-1-25

GOLD CUP CONTEST STARTS WITH BANG

15 POPULAR ANNOUNCERS PUT IN RACE ALREADY

Who Will Get 1925 Radio Digest Trophy? Make Nominations and Save Ballots

Hardly had the last issue of Radio Digest been placed on the newsstands before the first nomination came in for the second annual Radio Digest Gold Cup Award for world's best Radio announcer for 1925. In the few days remaining before this issue was put to press fifteen popular announcers had been nominated by Radiofan admirers.

The competition for the 14-carat, solid gold cup bids to be hot this year!

If your favorite's name does not appear in the list of fifteen so far nominated, get busy and fill in the nomination blank in the lower left corner of page 14 of this issue. Then save your ballots for him. Don't miss a single ballot, for when these are turned in to Radio Digest in a group of CONSECUTIVE numbers, extra bonus votes are allowed the announcer for whom you are voting.

How Bonus Votes Are Given

The ballots, top of page two, numbered consecutively, will appear in each issue of the Radio Digest until the close of the contest, with the August 22 number. Each of these ballots will count for one vote when sent in separately. You can hold these ballots until you have 4 that are consecutively numbered, and when they are sent in a bonus of 3 votes will be allowed for your favorite announcer. For each 8 consecutively numbered ballots your candidate will receive a bonus of 20 votes. For each 12 consecutively numbered ballots 30 votes. For each 16 consecutively numbered ballots 40 votes. For each 20 consecutively numbered ballots 50 votes, and for each 22 consecutively numbered ballots 60 votes bonus will be allowed.

Send nominations or ballots to the GOLD CUP AWARD EDITOR, Radio Digest, 510 N. Dearborn St., Chicago.

Fifteen Announcers Nominated

The fifteen announcers who have been nominated already by ardent followers are:

- KDKAH. W. Arlin
- KPKXBill (W. G.) Hay
- KOWRichard Haller
- KWJJohn Daggett
- KYWSteve Trumbull
- WBAPHired Hand
- WDAFLeo Fitzpatrick
- WEAFGraham McNamee
- WGNQuin A. Ryan
- WGYKolin Hager
- WLSGeorge D. Hay
- WLWFred Smith
- WQAWGene Rouse
- WOCS. W. Barnett
- WSBLambdin Kay

It is interesting to note that included in the list are the winner and many strong competitors for the 1924 Gold Cup Award.

All broadcasting station announcers in the United States, Canada, Cuba, Europe, Asia, South America or elsewhere, are eligible to be nominated and voted for.

Is your beloved "voice" included in the entries? If not, be sure to send his name along. You don't know his name? Ask the GOLD CUP AWARD EDITOR. He knows and will tell you.

Several Broadcasters Listed for Standard Frequencies

NEW YORK.—Deviation of broadcasting stations WEAJ, New York, WRC and WCAP, Washington, from their new wave lengths or frequencies recently assigned, have been zero, according to an announcement by the Radio section of the bureau of standards. Stations WWJ, Detroit; WSB, Atlanta; WGY, Schenectady, and WBZ, Springfield, varied one-tenth of one per cent in the past two months. They therefore constitute standard stations by which fans may calibrate their wave meters and sets.

FRED SMITH TO SEE STATIONS IN EUROPE

TO WRITE ABOUT TRIP FOR RADIO DIGEST READERS

Crosley WLW Director Will Visit Principal European Countries in Quest of Radio Information

CINCINNATI.—Fred Smith, nationally known announcer and program director for Crosley WLW station here, is going to Europe within the next few weeks to write for American newspapers and magazines on Radio conditions in England, Germany, Holland, France, Belgium, Spain, Switzerland, Italy and Russia.

He has contracted to supply an exclusive weekly news letter for Radio Digest.

Readers of Radio Digest will read Mr. Smith's articles with much interest. He will tell the history of broadcasting development in each country, what is actually being done at present and European ideals for the future.

He will compare European programs to those in America. He will answer the question, as far as Europe is concerned, "Who pays for broadcasting?"

Well Qualified as Observer

Mr. Smith is well qualified as European observer, because for eight years he traveled and studied in Spain, Belgium, France, Germany, Holland and England.

Fred Smith, besides chronicling European broadcasting, will bring back with him all the best things in Radio programs and entertainment Europe has to offer. His originality in conducting WLW has classed him as one of the foremost broadcast trail-blazers. If his past performance is indicative of his journey abroad, it may be said that European station directors will be taking pointers from him.

CROSLY DIRECTOR WILL GO TO EUROPE



Fred Smith, director and announcer for Crosley, WLW, Cincinnati, will soon leave this country for a trip abroad, where he will study Radio conditions in all principal European countries. He has been engaged to write a weekly exclusive article on his findings for readers of Radio Digest.

RADIO TRAIN CONTROL

(Continued from page 1)

"The supervisor at the central office would receive complete information by Radio at all times as to the position and operation of the train; he could take personal charge of its operation at any time; and he could talk directly to the passengers to give them any desired directions."

The Radio features of this system, according to Mr. Allen, are of the "carrier current" type; namely, Radio waves which travel along the power lines of the railroad instead of spreading out through the ether as in ordinary broadcasting. By using this system, the waves can be directed to any desired point and can be utilized to operate switches and other devices, as well as to carry on conversations. This system is now being used practically by many electric power and street railway companies for controlling distant switches and for talking between any points on the system.

Radiophones for Freight Trains

"An interesting railroad application of this system," said Mr. Allen, "is its use on long freight trains. Some trains are upwards of a mile long and the ordinary methods of communication between the engineer at the head of the train and the conductor in the caboose at the rear, or the engineer of a pusher locomotive, become difficult to use. Carrier current Radio telephones can now be installed on a train which make communication between various parts of it as easy as between the offices in a building."

RAISE CYCLONE FUNDS

(Continued from page 1)

Judge," went on the air and gave such a heart-throbbing picture that even before he had finished the checks began to come in.

"WLS Unlimited" Brings in Pledges

All through the night, the "Judge" kept at the microphone, using every means possible to increase the number of checks pouring into the studio. For any person who sent in a pledge for \$100, the "WLS Unlimited" left the roundhouse and traveled to the home of the donor, where one of the train crew—usually Ford or Glenn—sang a special song for their benefit.

News bulletins were broadcast through the night from Station WGN for the benefit of anxious listeners. In order to furnish this information, Quinn A. Ryan, chief announcer, and George Curran, operator, stationed themselves at amateur Station 9AAW at the home of W. E. Schweitzer. Through terrific static conditions 9AAW succeeded in getting in touch with 9ELO at Morrisville, Ill. just on the edge of the storm-swept area. Later 9YAU, Carthage college, at Carthage, Ill., was heard from.

KYW and Others Do Bit

At the Hearst Square studio of KYW, Steve Trumbull, the "Mark Twain of Radio," sat at the microphone and informed the Radiophans about the list of dead and injured. All through the following day and night he announced the lists of casualties as soon as they arrived at the studio.

Other stations in and near Chicago contributed their share of help in the emergency. Included were WJJD, WTAS, WQJ, WBCN and WEBB.

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Looking Ahead

WEBB, "The Voice of the Great Lakes," Chicago, is the next station to be pictured and described in the series of page feature articles devoted to various broadcasters. Learn about "Bob" Boniel and his Edgewater Beach hotel studio in the April 11 issue of Radio Digest.

Who Is Best Announcer? Who would you have win the 1925 Radio Digest Gold Cup Award? Who shall this publication present with its second \$5,000 solid gold trophy? Follow the announcers' contest weekly in Radio Digest, and save your ballots for your favorite. Help him to win.

The A. B. C. Course in Radio Fundamentals Takes Up the Basic Principles of inductance and magnetic coupling in the next article. Thorough understanding of these underlying facts is essential to the grasping of later data on the use of inductance in Radio frequency circuits and how it influences tuning.

A New Type of Operating Articles on standard receivers will be started in next week's issue, with the Crosley Trirdyn as the first set under discussion. In addition to telling how to tune, each article will go into detail as to what occurs in the mystifying maze of wires when the dials are rotated.

Jacques Fournier's Four Filter Super has now been constructed with two different systems of audio frequency amplification, so it seems logical to next discuss a way of testing should this sharp tuning set fail to "perc" on first trial or go wrong after being in operation awhile. Mr. Fournier will, therefore, consider trouble shooting next week.

Newsstands Don't Always Have One Left

WHEN YOU WANT

Radio Digest

YOU WANT IT!

BE SURE OF YOUR WEEKLY COPY BY SUBSCRIBING NOW

SEND IN THE BLANK TODAY

Publisher Radio Digest,
510 N. Dearborn St.,
Chicago, Illinois.

Please enclose check **\$5.00** for Five Dollars (50c Foreign) for One Year's Subscription to Radio Digest, Illustrated.

Name.....

Address.....

City.....State.....

SILVER SHEET STARS FROM MOVIE TRAIN HERALDED BY KFI STOP AT WOC



Left to right: Anna May Wong, Jack Tighe, Edna Gregory, Ruth Stonehouse, Jack Dougherty, Cullen Landis, Bryant Washburn, Kathryn McGuire and Carl Miller. The screen stars are touring the country on a train heralded in advance by KFI. This picture was made at WOC.

STATION GLEANINGS AND NEWSY BRIEFS

TELL HITHERTO UNTOLD DISCOVERIES AT KOA

Floyd Collins' Father Speaks from WLW—Bernarr MacFadden Conducting Exercises at WOR

Unpublished discoveries of prehistoric American civilization of more than 1,200 years ago will be described in a unique program April 8, from Station KOA, Denver, Colo.

Station WTAS, Elgin, Ill., has a new orchestra to replace that of Fred Hamm. Husk O'Hare's famous orchestra is known to thousands.

"Civilian Clothes," a comedy in three acts, will be presented by the KGO players, Oakland, Calif., April 9. It will be presented under the direction of Wilda Wilson church.

Professor Joseph Blumenthal, internationally known scientific character analyst, will begin a series of talks from Station WCCO, Minneapolis, Minn.

Speaking from Station WLW, Cincinnati, Ohio, the father of Floyd Collins thanked the public for their assistance during his son's imprisonment. He asked for assistance in raising a fund for the Floyd Collins memorial.

Everything is rosy at Stations WJZ and WJY. Milton J. Cross, better known as announcer "AJN," has become the father of a buxom baby girl. It is known as the "first WJZ baby."

The program by "Roxy and his gang" from the Capitol theater, New York City on Sunday evenings is now being broadcast simultaneously through WEAF, New York; WEEI, Boston; WJAR, Providence; WCAF, Washington; WDBH, Worcester; and WWSJ, Detroit.

The "Early Bird Gym Class," originated by Station WOR, Newark, N. J., is creat-

ing considerable comment among fans. It is now being conducted by Bernarr MacFadden, one of America's leading physical culture exponents.

Station WGBS, New York city, is broadcasting every Tuesday at midnight for half an hour an organ recital from the Piccadilly theater, given by John Hammond.

A dinner tendered to Gov. Alfred Smith of New York by the Friars club was recently broadcast by Station WHN, New York, direct from the Hotel Astor.

"Ten Nights in a Bar Room," was presented recently from Station WOC, Davenport, Iowa, by the dramatic club of the Palmer School of Chiropractic.

Station CNRW, Winnipeg, Can., recently celebrated its anniversary program. Thousands of telegrams and letters poured into the studio during the performance.

Shenandoah Gets New Set
WASHINGTON, D. C.—Ten 250-watt tubes are found in the immense new transmitting set recently installed aboard the Shenandoah, giant Navy air cruiser. The giant transmitter is surpassed by but few broadcasting stations and was built for the airship when plans, later vetoed, were made for it to go to the North Pole.

Bryan Brothers, of Cleveland, Pave Way for Broadcasts of Better Music

By P. A. Price

THE white man in the jungle, sitting in at the tribal dance of the blacks, hearing the rhythmic beat of the tom-toms and rattle of the dried gourd, feels an impulse to join the whirling, stamping crowd; to shout with them, dance with them, to throw aside the restraint and discipline of his race and revert to the status of the primitive entity within him—that entity within me, you, all humankind. Hence the appeal of jazz, pandering to the atavistic urge of the subconscious."

So said Osborne A. Bryan; student of the theory and mechanics of harmony and who, with his brother Leonard Z. Bryan, Jr., has done probably as much for the elevation of Radio musical offerings as any individual in the country.

Pave Way for Higher Ideals

The Bryan brothers live in Cleveland, Ohio, and it is from the Cleveland broadcasting stations that these two men are unostentatiously introducing to their unseen audiences the charm and beauty of music as it has developed through the countless ages of man's efforts in pursuit of harmony. Their idea is not to

Oregon vs. Stanford on Air at KGW-KLX

800-Mile Debate Decision in Hands of Listeners

EUGENE, Ore.—Oregon and Stanford debating teams went on the air in the second intercollegiate Radio debate in the West on March 25. The Oregon mon argued the question of the Japanese immigration law from Station KGW, Portland, and the Stanford team from Station KLX, Oakland, Calif.

The teams, although approximately 800 miles distant from each other, followed the ordinary form and convention of the usual debate.

Decision in the Oregon-Stanford debate will be by mail, the Radio listeners north of the California line sending their ballots to Station KGW and south of the boundary to Station KLX. The vote is now being tabulated.

New Seattle Radio Club

SEATTLE, Wash.—The Broadcast Listeners' club, open only to residents of the University district, a suburb of Seattle, has been organized to clear up electrical interferences and exchange Radio ideas.

FRACTION OF METER BAND FOR AMATEUR

HOOVER ASSIGNS DECIMAL WAVES FOR RESEARCH

Experimenters Get Wave Band 19/100 Meter Long—If Developed May Eliminate Interference

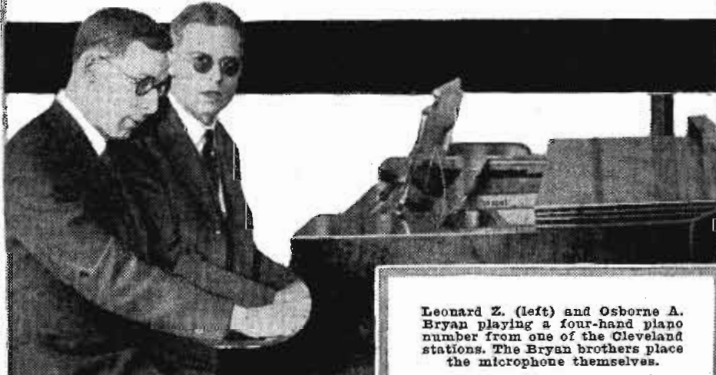
WASHINGTON, D. C.—Secretary Herbert Hoover has authorized transmitting amateurs to use waves less than one meter in length in addition to their previous assignment. The permission covers the channels between .7477 and .7496 of a meter; in other words, a band at about (10 3/4-meter wave length.

Few people realize the immense number of possible operating channels that lie in the low wave lengths. While the band now assigned to amateurs is only nineteen one-thousandths of one meter in width, its extremes are separated by 1,000 kilocycles.

The secretary of commerce pointed out that if it ever became feasible to conduct broadcasting at these high frequencies, it would be possible to place within this band 100 broadcasting stations and give to each the present separation of 10 kilocycles. Mr. Hoover said further that all the stations in the world could operate in the upper half of the one meter band. The art has of course not developed to make this possible, but the amateurs now have an opportunity to see what they can do in the way of trail blazing.

Outlaw Broadcaster Closed Down by Court Proceedings

LOS ANGELES.—The activities of an outlaw broadcast station were terminated here abruptly recently in a hearing before United States Commissioner Turney, when the defendant, George W. Fellows, residing at the Fremont Arms hotel, fell in a faint at the beginning of the proceedings and had to be sent to the hospital. The case is the first of its kind to be filed in local federal court, and according to agreement entered into between attorneys will be dismissed if Fellows will dismantle his station.



Leonard Z. (left) and Osborne A. Bryan playing a four-hand piano number from one of the Cleveland stations. The Bryan brothers place the microphone themselves.

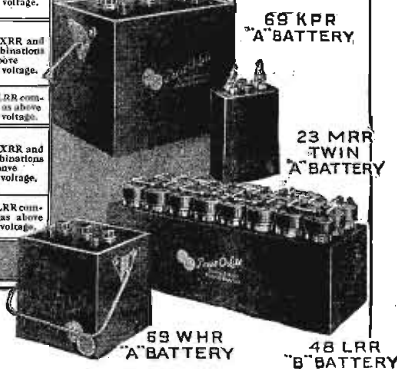


Prest-O-Lite

RADIO CHART

| Voltage of Tubes | No. of Tubes | Type of Tubes (see foot-note) | Total Rated Amperes Drain | Recommended Prest-O-Lite "A" Batteries | | Recommended Prest-O-Lite "B" Batteries | |
|--|-----------------------|-------------------------------|---------------------------|--|----------------------|--|--|
| | | | | One by Rating | One by Amperes Drain | See Manufacturer's Special Voltage | Give as Rating Type |
| 5-Volt Tubes <small>C-300 and UV-200 are interchangeable. C-301A, DV-2 and UV-201A are interchangeable.</small> | 1 | UV-200 | 1 | 69 WHR | 22 | 22½-24 | One 24 XRR |
| | | | | 67 WHR | 16 | | |
| | 2 | UV-201A | ½ | 67 WHR | 33 | 45-48 | One 48 XRR |
| | | | | 611 WHR | 22 | | |
| | 2 | 1 UV-200 1 UV-201A | 1¼ | 69 WHR | 17 | 90-96 | Two 48 XRR |
| | | | | 69 WHR | 29 | | |
| | 3 | UV-201A | ¾ | 67 WHR | 22 | 45-48 | One 48 XRR |
| | | | | 611 RHR | 21 | | |
| | 3 | 1 UV-200 2 UV-201A | 1½ | 69 WHR | 14 | 67-72 | One 24 XRR One 48 XRR |
| | | | | 69 WHR | 22 | | |
| | 4 | UV-201A | 1 | 67 WHR | 16 | 90-96 | Two 48 LRR |
| | | | | 613 RHR | 22 | | |
| 4 | 1 UV-200 3 UV-201A | 1¾ | 611 WHR | 15 | 90-96 | Two 48 LRR | |
| | | | 611 WHR | 22 | | | |
| 5 | UV-201A | 1¼ | 69 WHR | 17 | 45-48 | One 48 LRR | |
| | | | 613 RHR | 19 | | | |
| 5 | 1 UV-200 4 UV-201A | 2 | 611 WHR | 13 | 67-72 | One 24 LRR One 48 LRR | |
| | | | 611 RHR | 21 | | | |
| 6 | UV-201A | 1½ | 69 WHR | 14 | 90-96 | Two 48 LRR | |
| | | | 69 KPR | 21 | | | |
| 8 | UV-201A | 2 | 67 KPR | 15 | 45-48 | Use combinations of LRR as specified above for same voltage. | |
| | | | 67 KPR | 22 | | | |
| | | | 69 KPR | 13 | 67-72 | Use combinations of LRR as specified above for same voltage. | |
| | | | 69 KPR | 19 | | | |
| | | | 69 KPR | 16 | 90-96 | Use combinations of LRR as specified above for same voltage. | |
| | | | 69 KPR | 16 | | | |
| 3-Volt Tubes | 1 | | .06 | | 100 | 22½-24 | Use same XRR and LRR combinations as above for same voltage. |
| | 2 | UV-199 | .12 | One 43 MRR | 50 | 45-48 | |
| | 3 | C-299 | .18 | | 33 | 45-48 | |
| | 4 | DV-1 | .24 | | 25 | 67-72 | |
| | 5 | DV-3 | .30 | Two 43 MRR in Parallel | 40 | 90-96 | |
| 1.1-Volt Tubes | 1 | WD-11 | ¼ | One 23 MRR Twin | 48 | 22½-24 | Use same XRR and LRR combinations as above for same voltage. |
| | 2 | WD-12 | ½ | | 23 | 45-48 | |
| | 3 | C-11 | ¾ | Two 23 MRR Twins in Parallel | 32 | 45-48 | |
| | 4 | C-12 | 1 | | 23 | 67-72 | |
| | 5 | 215A | 1¼ | | 29 | 90-96 | |
| | 6 | 215N | 1½ | 23 MRR Twins in Parallel | 23 | 45-48 67-72 90-96 | |

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Write today for this free booklet

Whether you have a one-tube set or most advanced multi-tube outfit, you'll find a fund of interesting information in our booklet, "How to fit a storage battery to your set—and how to charge it."

This booklet gives you the complete Prest-O-Lite Radio Chart—technically accurate recommendations covering both "A" and "B" storage batteries for every type of set.

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How to fit storage batteries to your set

It pays to buy wisely—to select batteries that bring out the best in your set and are of the right capacity to give fine reception at recharging intervals best suited to your convenience.

The new Prest-O-Lite Radio Chart shown here tells you how to select such batteries. Use either of the two sizes of "A" Batteries recommended for your set, depending on the days of service you wish between chargings (based on the average use of your set of three hours a day). You will find the larger capacity battery more desirable unless facilities are provided for frequent and easy recharging. Use the "B" Battery combinations that give the plate voltage recommended by

the manufacturer of your set. Prest-O-Lite "B" Batteries serve from two to four months without recharging.

Special structure plates, high porosity separators and scientific internal construction make Prest-O-Lite Batteries dependable sources of the even, unvarying current absolutely necessary for volume, clarity and distance.

Prest-O-Lite Batteries are made to give long, faithful service. They're easy to recharge—and offer you truly remarkable savings. Though standard in every respect, they are priced as low as \$4.75 and up. See them at your dealer's—or write for "How to fit a storage battery to your set—and how to charge it."

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New York San Francisco
In Canada: Prest-O-Lite Company of Canada, Ltd., Toronto, Ont.

Prest-O-Lite



WHB—"The Heart of America"



E. J. Sweeney, owner and founder of Station WHB. Below, Morrell Moore, organist of the Linwood theater, who broadcasts regularly.



View showing the Sweeney Radio orchestra and interior of studio from which they broadcast their selections.



George H. Stone, program manager and sponsor of many of the station's features. Below, John F. Schilling, chief engineer and announcer. © U. & U.



WHB, the broadcasting station of the Sweeney Automotive and Electrical school at Kansas City, has attracted a large share of the attention of the Radiophans throughout the United States and the surrounding territory, for the scream of its siren before each schedule attracts more attention than a fire engine speeding down a city thoroughfare. Listeners know that this siren is a signal that some real entertainment is in store for them.

All of the credit for the success of WHB goes to Emory J. Sweeney, head of the Sweeney school, which is one of the largest auto schools in the world. There is no station owner in the country who is a more ardent Radiophan than Mr. Sweeney, the founder of WHB. He was one of the first business men in the United States to realize the possibilities of Radio broadcasting.

Mr. Sweeney's first investment was a 250-watt composite transmitter, assembled by his engineers and installed on the top floor of the ten-story Sweeney building. This was in May, 1922, when there were only a small fraction of the number of broadcasting stations which there are in existence today.

Of course, the popularity of WHB demanded a larger transmitting set, and so a 500-watt transmitter was installed in August, 1922. In order to insure having high class entertainment at all times an orchestra was hired to do nothing but play for the WHB audience.

The man responsible for the most of these novelties and features is George Hamilton Stone, general manager of the Sweeney school, and program manager of WHB.

John T. Schilling, chief engineer and announcer of WHB has been with the station since it first opened. He understands Radio perfectly, having been connected with it since 1916. For quite a while Schilling was a wireless operator in service with the United States navy. He is a first class commercial operator as well as announcer. His voice, which has often been called the "golden voice of WHB," is easily recognized for its clearness and distinctness.



A. A. Murray is assistant operator and announcer. He was also a Navy Radio operator before being employed by Sweeney. He assists Schilling in announcing programs.

A recent addition to the Radio department is Mr. Earl Nesbitt. His official title is development manager. He was formerly in the theater business, and is therefore a very competent critic. His reviews of the current motion picture showings are eagerly awaited by the women who tune in on the ladies' hour program to learn the coming events. (Continued on page 7)

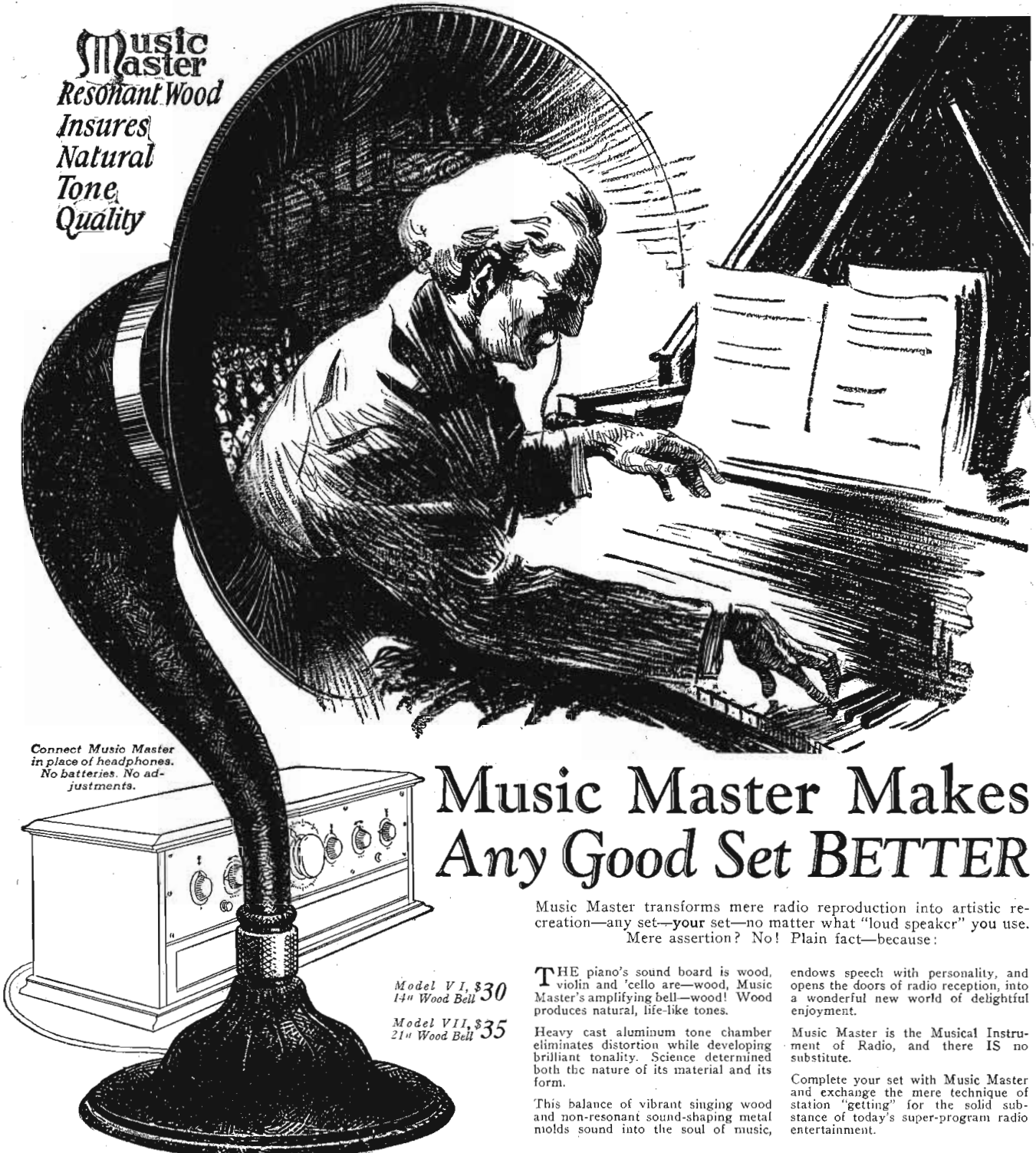


Earl S. Nesbitt, development manager and theatrical critic.



Reception room at Station WHB, where visitors are entertained and performers await their turn at the microphone.

Music Master
 Resonant Wood
 Insures
 Natural
 Tone
 Quality



Connect Music Master
 in place of headphones.
 No batteries. No ad-
 justments.

Music Master Makes Any Good Set BETTER

Music Master transforms mere radio reproduction into artistic recreation—any set—your set—no matter what "loud speaker" you use. Mere assertion? No! Plain fact—because:

THE piano's sound board is wood, violin and 'cello are—wood, Music Master's amplifying bell—wood! Wood produces natural, life-like tones.

Heavy cast aluminum tone chamber eliminates distortion while developing brilliant tonality. Science determined both the nature of its material and its form.

This balance of vibrant singing wood and non-resonant sound-shaping metal molds sound into the soul of music,

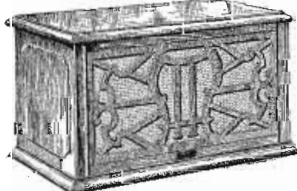
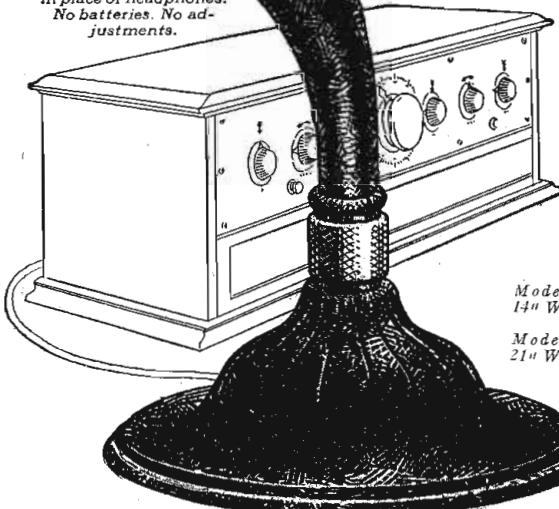
endows speech with personality, and opens the doors of radio reception, into a wonderful new world of delightful enjoyment.

Music Master is the Musical Instrument of Radio, and there IS no substitute.

Complete your set with Music Master and exchange the mere technique of station "getting" for the solid substance of today's super-program radio entertainment.

Model VI, \$30
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Tenth and Cherry Streets

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Model V, Metal Cabinet, Mahogany Finish, Wood Bell \$18



Music Master RADIO REPRODUCER

WGN SOLVES EQUITY CHARGE FOR SHOWS

FAIR STORE PAYS FEE FOR "SHOW-OFF" BROADCAST

Quin A. Ryan Hits on Plan to Make Direct from Theater Pickups Possible

CHICAGO.—In putting the popular comedy, "The Show-Off," on the air, Station WGN chalked up another huge theatrical success, following the station's record-breaking applause for broadcasting "The Mikado" and "H. M. S. Pinafore." WGN is the only Chicago station that has broadcast a theatrical performance direct from the stage since the Actors' Equity decreed that the actors be paid for an entire extra performance.

Last Friday evening WGN broadcast "The Show-Off" from Cohan's Grand theater, the comedy that has run over a year in New York. Quin A. Ryan, chief announcer at WGN, has hit upon a plan to cover the Equity charge—by letting an outside advertiser give a "Radio theater party" for its customers the country over. "The Show-Off" constituted a Radio theater party given by the Radio department of the Fair store in Chicago.

Mr. Ryan arranged with Miss Rosalie Stewart, producer of the comedy, to have the actors focus their spoken lines on the center of the stage that evening, where the main microphone was located in the footlights. "The Show-Off" was selected by WGN because of its fitness for broadcasting. It is a screamingly funny comedy of American middle-class home life, chosen because of the universal appeal of its humor, its entertainment for the ear alone and its independence of tricky stage "business." A play with a vast amount of laughs from the theater audience provides the necessary psychological background for a theatrical broadcast.

WSB TO GET NEW HIGH POWER SET

Latest Type 2,500-Watt Western Electric Transmitter to Add to "Voice of South"

ATLANTA.—Earliest possible installation of an entirely new type of Western Electric broadcasting station was announced by The Atlanta Journal, operators of Station WSB, on the recent occasion of the third birthday of "The Voice of the South."

Atlanta will have the first one of the transmitters of its kind on the air. The power ranges from a minimum of 1,000 watts to a peak of 2,500 watts. WSB's new equipment is expected to be placed in operation before midsummer.

The Journal station is the oldest newspaper station in the South and one of the first in America.

Foreign Notes

Jernsalem is to have a broadcasting station. It will be on the air every night beginning June 1.

The Garlands hotel in London, Eng., is the first hotel in Europe to be equipped with Radio in every room. The fact that this hotel is over 100 years old further increases the interest.

Broadcasting will probably begin in Japan early in April. It was originally planned to begin March 1, but the opening had to be postponed.

LOW, operated by Sanchez y Cia, Buenos Aires, Argentina, is broadcasting a complete daily program on 325 meters with 500 watts power. Plans have been made to increase the power to 10,000 watts soon.

Three Cornishmen are making ready to leave Plymouth, England, on a voyage round the world in a life boat. They intend to prove conclusively the value of Radio in the event of a boat being cast adrift at sea.

LOY, Sociedad Radio Nacional, located at Buenos Aires, Argentina, broadcasts regularly on 325 meters. A power of 1,000 watts is used.

Although Radio has not proved of much assistance to the police of Breslau, Germany, it was enough to help stop a crime wave. One band of thieves heard a police description of themselves broadcast, and stopped their operation.

Work has started on the new Radio station located atop Mount Saleve, over-

WHERE 1,200 KIDDIES BROADCAST



One of the most wide-awake youngsters to be heard from the Loyal Order of Moose, Station WJJD, at Mooseheart, Ill., is 7-year-old Elmer Fell. He is shown above with Jack Nelson, the director of WJJD, who says he never knows what Elmer is going to do or say next, although he never fails in his performance in front of the microphone. Elmer is just one of the 1,200 boys and girls who broadcast at Mooseheart, the City of Childhood, maintained by the 600,000 members of the order to care for the dependent children of their deceased brothers.

looking Geneva, Switzerland. When completed—in about four years—it will be one of the show places of Europe. The League of Nations will broadcast there.

Radio-Belgique, located in Belgium, is now broadcasting in both Belgian and Flemish. The latter is for the benefit of fans in Holland.

All fire and police stations in Austria are being equipped with sending and receiving apparatus. They will work on short waves to intercept criminals throughout the country.

London's new broadcast station, which is to take the place of the present 2LO transmitter at Marconi house, will shortly be brought into use. It will be one of the finest stations in the world.

Station Changes

Beginning April 4, Station WAMG will broadcast every day from 11:55 to 12:05 p. m. the Arlington time signals and weather reports.

Jacksonville, Fla., is to have a 500-watt broadcasting station in the near future. The city fathers have pledged to place \$10,000 in the next budget to complete payment for the station.

Completion of a direct wire link between Station WBZ, Springfield, Mass., and the studios of WJZ-WJY, New York, have been announced. The WJY-WJZ-WGY-WRC-WEZ system now covers the whole eastern half of the continent.

The following new licenses have been issued: WIEM, Chicago, Ill.; WHBN, St. Petersburg, Fla.; WHBO, Pawtucket, R. I.; and WHBP, Johnstown, Pa.

WHB AT KANSAS CITY

(Continued from page 6)

This ladies' program is exceedingly popular with the women, whose only chance to listen on the Radio comes in the afternoon. The schedule is from 2 to 3 o'clock each afternoon, except Saturday and Sunday. Women find rest and relaxation from housework when they are tuned in to the entertaining and instructive features of this program.

Music for these afternoon programs, as well as for other evening programs, is furnished by Gilbert Jaffey's Music Masters, also known as the Sweeney Radio orchestra. Gilbert Jaffey, violinist and director, and Jess Sutton, pianist, have won especial favor among the fans.

A WHB feature which has attracted nationwide attention is the Sunday morning religious service which is broadcast from the Linwood Boulevard Christian church.

Organ music by Morrell Moore at the Linwood theater in Kansas City is broadcast each Sunday night at 11:30 o'clock, as well as Wednesday afternoon. Special equipment has been installed in the theater so that the full quality of the music may be enjoyed by the listener.

The station has also experimented to quite an extent in rebroadcasting and has had remarkable results. One of the

reports from Apia, Samoa, states that this station's rebroadcasting was received with more volume than the original signals were received.

VICTOR ENDS SERIES TO STUDY EFFECTS

IF RESULTS JUSTIFY, PROGRAMS MAY CONTINUE

Seventh Recital Closes Season—Many Artists Leave for Foreign and Concert Tours

NEW YORK.—The series of cooperative experiments between the Victor Talking Machine company and the American Telephone and Telegraph company in bringing world-famous artists of the former before the microphone was terminated with the presentation on Thursday evening, March 26. The final concert, bringing the present series to a close, made the total number of recitals seven.

The public response to these programs has been most enthusiastic. The Victor company now wishes to study the results of the experiment, which at first was carried on through a chain of eight broadcasting stations linked to WEA, New York. The chain later grew to fourteen stations, located as far west as Davenport, Iowa.

Compled with the desire to study the effects of the broadcasts is the fact that the concert and opera season is rapidly drawing to a close and the majority of the artists in this field are either leaving for foreign shores or embarking on concert tours.

Experiments are now being carried out in England which may eventually lead to clocks becoming self-adjusting. The idea is to fit the clock with gear which will pick up Radio signals from an observatory and thus set the hands at predetermined intervals.

\$1000 for a NAME!

It's worth that much to us—a name for a new auxiliary unit recently perfected by our engineers



26 PRIZES for the 26 Best Names Suggested

YOU can win one of these prizes. Just tell us what you would call this new auxiliary unit — a simple, yet forceful name.

Prizes Are as Follows

For the best name, \$100 in cash and one \$35.00 auxiliary unit. For the 25 next best names, one \$35.00 auxiliary unit for each name suggested. Should two or more persons submit the name selected as best, second best, etc., each will be awarded the prize for which they are tied.

Rules of Contest
Contest is open to everybody. You do not have to own a radio set or buy an Auxiliary Unit. Send in as many names as you choose. Each name may win a prize.
Contest opens March 20, 1925, and closes promptly at midnight, April 30, 1925. Announcement of prize awards will be made immediately thereafter.

The judges for the contest will be the officials of the Walbert Mfg. Co.

Send all names to contest department, WALBERT MANUFACTURING CO., P.O. BOX 929, Wrightwood Avenue, Chicago, Ill.



FIRST, read carefully these facts. They state briefly and accurately what this auxiliary unit has done—what we positively guarantee the auxiliary unit will do when hooked-up with your set or any set:—

1. Increase the selectivity of your set as you would have it.
2. Give you absolute control over local interference.
3. Give your set the clarity and tonal qualities of a perfect musical instrument.
4. Give you amazing power—power to pierce greater distances with more volume.
5. Positively eliminate all radiation.
6. Permits efficient use of short or indoor aerial, thereby greatly reducing static.
7. Make your set better, no matter how good it now is.
8. Anybody can connect this unit in a few minutes.

Furthermore this auxiliary unit:—

9. Will not alter the dial readings of your set.
10. Will not make your set unstable no matter how many stages of AF or RF amplification it already has.

These are facts. We unreservedly guarantee their accuracy. More than that, we will gladly demonstrate them to you at our expense. With your permission we will send this unit to you for a 7 days' test with your set. It must convince you by performance. It must do all we have said. It must fulfill your expectations or you may return the unit, and we will promptly refund your money.

Now—with Spring coming—is the time to make this test. This auxiliary unit works perfectly summer or winter. Send in the test application blank today.

JOBBERS AND DEALERS

Write us for further details, prices and discounts on this new unit.

WALBERT MANUFACTURING COMPANY

929 Wrightwood Avenue CHICAGO, ILL.

TEST APPLICATION

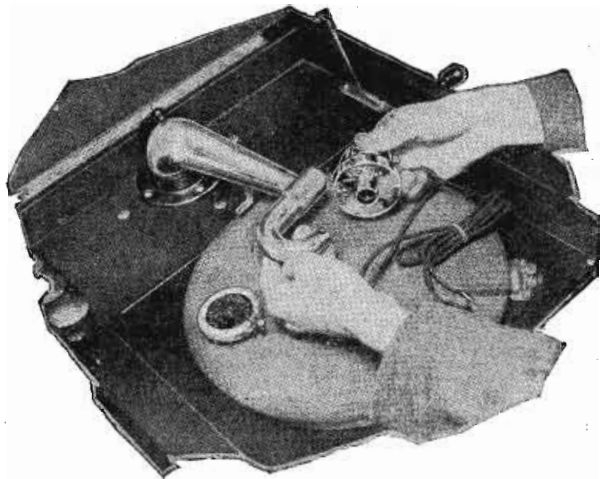
WALBERT MANUFACTURING COMPANY
929 Wrightwood Ave., Chicago, Ill.

GENTLEMEN: Enclosed please find check for \$35.00. Send me the auxiliary unit for a 7 days' performance test. Should the auxiliary unit fail to meet with my expectations I will return it to you at your expense and you will immediately refund my money. If I am a prize winner you will refund my money.

Name.....Address.....
City.....State.....

AN EVENING AT HOME WITH THE LISTENER IN CENTRAL TIME (SEE INSTRUCTIONS FOR USE BELOW)

Table with columns: Station and City, Met., Saturday, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday. Lists radio stations and their broadcast schedules.



Phonograph to Radio in a Jiffy—

Phonographic reproduction is justly famous for its accuracy and tone. But your own Phonograph will excel its prior performance when you connect it with your Radio set by a Jewett Vemco Unit.

Slip on or off in a jiffy—no tools needed.

A phonograph one minute, a Radio loud-speaker the next.

But be sure the unit is a Vemco—the leader of all Radio-Phonographic equipment!

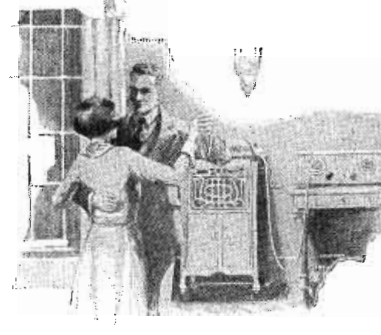
The same reproducer we use in the world-famous Superspeaker—Adjustable for volume control—A real musical instrument built by experienced musical instrument maker—Standard model fits Victrola tone arm—simple adapters for other phonographs.

"THERE IS NO SUBSTITUTE FOR THE BEST"

JEWETT RADIO & PHONOGRAPH CO.

5670 Telegraph Road

Pontiac, Michigan



The Jewett Vemco Unit

Dick a licensed operator, experimenter and designer. Jerry drifted to Memphis and when "The Solemn Old Judge" went to WLS, Chicago, he took a whirl at announcing. Dick stayed home, experimented, tested and finally built the station at Jamestown.

Dearing Brothers in Dual Broadcast Act One Directs WMC, Other WOCL; Both Do Their Bit

MEMPHIS.—Enter the Radio brothers, Jerry Dearing, director of WMC, Memphis, and Dick Dearing, operator, builder and general supervisor at WOCL, Jamestown, N. Y. Jerry is the older and Dick the younger of the pair. Radio plays some weird tricks on families. Back in the home town of the brothers, Dick is the Radio expert. While Jerry was in the army and before, Dick was tinkering with Radio. Jerry became a newspaper reporter;

KFOA Has Song Contest

SEATTLE, Wash.—The Seattle Times. In cooperation with KFOA, has announced a song writers' contest to run until June 1, which has as its object the uplift of popular music. Harold Weeks of the Brunswick shop here is sponsor of the competition.

WJAM, Cedar Rapids, Iowa, when operating as a 20-watt station, was heard distinctly in Surrey, England.

PANETTI BROTHERS ENTERTAIN AT WBZ

Saturday, April 4

Eastern Time Stations

The following schedules of programs are given in Eastern time. To change to Central time, subtract one hour; Mountain time, subtract two hours; Pacific time, subtract three hours.

Saturday, silent night for: CFAC, CFCA, CHNC, CHIC, KFAB, KFAE, KFDM, KFAU, KFKK, KFMO, KFUD, KOE, WBAF, WBAV, WCAI, WOOD, WDFW, WFAO, WEAR, WEBI, WEBW, WEEI, WGST, WHAZ, WHO, WIV, WKAG, WKAK, WBAI, WOI, WOO, WORD, WSAO, WSUI, WJVI.

WGR, Buffalo, N. Y. (319), 2:30-4:30 p. m., Radio Dealers musical program, J. P. Quinn, director; 6-7:30, dinner music; Hollywood string quartet.
WNN, New York, N. Y. (361.2), 8:30 p. m., Strand Roof orchestra; 9-10, Northminster service.
WIP, Philadelphia, Pa. (298.2), 6:00 p. m., songs, Charles Higgins; 6:15, Clarence Sampaun's concert orchestra; 7, Uncle Wip's bedtime stories; 8, talk, auspicious Philadelphia College of Pharmacy; 8:15, talk, University of Pennsylvania; Lenten talk; 9:15, concert and dance, Executive Radio Council, Third District; 10:35, Benjamin Franklin dance orchestra; 11:05, organ recital, Karl Bonawitz.
WIAR, Providence, R. I. (305.9), 7:05 p. m., studio program.
WJZ, New York, N. Y. (454.3), 4:30 p. m., Sherry's tea orchestra; 7, Freddie Rich and his Hotel Astor dance orchestra; 8, course on Jewish History and Literature, Dr. Lewis Finkelstein; 8:30, Liederkreis society orchestra; 10:30, Waldorf-Astoria dance orchestra.
WKAR, East Lansing, Mich. (286), 12:30 a. m., special dance program, Paxtime Players orchestra.
WLT, Philadelphia, Pa. (394.5), 1:30 p. m., dance orchestra; 7:30, Arcadia cafe concert orchestra.

dance music, Vincent Lopez's Hotel Mayflower orchestra; 10:30, Crandall's Saturday Nighters; 12, Sidney Seidenman's Colonial room orchestra.
WRO, Lansing, Mich. (285.5), 12 midnight, dance program, Frank Lopez and his Arcadian orchestra.
WTAM, Cleveland, Ohio (489.4), 6-11 p. m., dinner music, Hotel Statler concert orchestra; 6-12, Ev Jones and his WTAM dance orchestra.
WWI, Detroit, Mich. (352.7), 3 p. m., Detroit News orchestra.

Central Time Stations

The following schedules of programs are given in Central time. To change to Eastern time, add one hour; Mountain time, subtract one hour; Pacific time, subtract two hours.
KNF, Shenandoah, Iowa (265), 6:30 p. m., concert, Riverina, Rev. Harry Richmond, director; 8:30, concert, Tom Hound City, George Walker.
KFRU, Bristow, Okla. (394.5), 7:30-8 p. m., Sunday school lesson, Dr. Thomas Murray; 9-12, Kiwanis club of Wagoner; Indian trio; 3, reboute talk, R. E. McGuire.

Parker & Cameron; 12-1 a. m., Owl matinee, Clifton Newton Moore, harmonica player; Bobby Allen, tenor; Bob Duff, tenor.
WGL, Northfield, Minn. (338.9), 12 midnight, musical program, students of St. Olaf college.
WCCO, Minneapolis-St. Paul, Minn. (418.3), 8 p. m., dinner concert, Community Amusement association; 9, bedside photographs, Rev. Roy L. South; 9:30, Tommie Nalle, Sammie Siegel; 10, Minneapolis Athletic club orchestra; Tommie Nalle, Sammie Siegel.
WCE, Egin, Ill. (275), 7-8 p. m., WTAS orchestra; Frank Morris; 10:30-12, WTAS orchestra, Frank Morris; 10:30-12, WTAS orchestra, Frank Morris; 10:30-12, WTAS orchestra, Frank Morris.
WDAF, Kansas City, Mo. (365.6), 8:30-4:30 p. m., Star's radio orchestra; 6-7, Trison ensemble; 11:45-1 a. m., Merry Old Chief, Praxitiano Players; Eddie Kuhn's Kansas City Athletic club orchestra; Johnnie Campbell's Kansas City club orchestra.
WBBH, Chicago, Ill. (370.2), 7-8 p. m., Oricle orchestra; Sunday school lesson; Dan Russo, Tom Florito; 9-10, Oricle orchestra; Maggie Kelly, leader; Ignace Ghione, soprano; Pat Hanna; 11-12, Oricle orchestra; Lyons Brothers; Marie Wynn, leader; Imps, Frank Sylvano, Kay Romney, Beans Keating, Ned and Ches. Hays, conductor.
WFAA, Dallas, Texas (475.9), 6-7 p. m., musicians,



Leona May Smith, 8-year-old trumpeter, as she looks when she wakes up all the little brothers for the twilight meeting of the Boston Edison Big Brother club at WEBI. Mrs. H. C. Bretschneider, soprano, has become very popular with Rocky Mountain fans through her appearances at KGO and the General Electric station at Denver. Arthur T. Baker, artist, is a member of the KGO Little Symphony orchestra and is often heard in solo numbers during the Sunday concerts of this Oakland station.

Headliners of the Week

PANETTI BROTHERS, two well-known vaudeville entertainers of the east coast, will give a novelty musical act Saturday at WBZ which will give the fans something new in the amusement line.

Municipal bands of Canada are still competing in KCAC's prize band contest. The City of Farnham will play this Sunday afternoon and the mayor will give a short talk.

A fiddlin' contest was held recently in Arkansas and out of the fifteen old timers from the Ozarks, J. C. Callico, John Alvis and E. A. Miller were chosen. You may hear these champions Monday, April 6, at KFMQ, Fayetteville. The first prize winner, J. C. Callico, and his fiddle went through the Civil War together. Monday night is also home night for KFRU, Bristow. All the entertainers are related in some way to the Ethereal company.

Tuesday night the WOAI entertainers will present selections from the compositions of Brahms. The WOAI entertainers have won distinction in southern Texas for their classical interpretations.

You will be sure spring is here if you tune for WEMC, Eberlin Springs, Wednesday. Mary Lamson is resuming her weekly bird talks. D. P. Smith will also give an interesting talk on the "Archaeology of Southwest Michigan." KOA is commencing tonight a series of talks on the "Legends of a Lost People." These stories are based on archaeological expeditions. In Southwestern Colorado where immense ruins reveal to the watchful eye, histories of other Americans who lived a long time ago.

As a climax to the Lenten season, "The Risen King," an Easter cantata, will be sung Thursday by the Fletcher Methodist Episcopal church choir at WIP, Philadelphia. The oratorio which is particularly suitable for Good Friday music, "Seven Last Words of Christ" will be given by many stations. KPO, San Francisco and WCCO, the Gold Medal station, are among the stations broadcasting this composition.

WTAS and WCEE announce that they are moving their studio from Kimball Hall to the Blackstone theater, Chicago, beginning this week.



harmonica; A. VanderVoort, bass; special song cycle, Julien River; Hans VanderVoort, soprano.
KDKA, Pittsburgh, Pa. (389.1), 6 p. m., Washington band; 8, Pittsburgh Sun Radio Spirit club; 8:15, "America's Glory Land," Dr. C. A. Payne; 8:30, Washington band; Woodlawn glie club, Mrs. Isaac James.
WARG, Richmond Hill, N. Y. (315.6), 12-2 a. m., special program, Glen C. Smith's Paramount orchestra.
WBBI, New York, N. Y. (272.6), 8 p. m., Malcolm Carment, clarinetist; 8:30, Can. Park, Violinist; 8:15, Bible questions and answers; 8:30, Carl Park, violinist; 8:50, Malcolm Carment, clarinetist.
WBZ, Springfield, Mass. (333.3), 8 p. m., Leo Reisman Hotel Jazz ensemble; 7:05, bedtime story for the kiddies; 7:15, marcher, U. S. Naval history; 8, S. B. Brandt; 7:30, Hotel Kimball trio; 8, "Happy Hawking" dance orchestra; 8:30, Radio checker game, A. McCullough; 8:45, music; 9, William L. Spittal, tenor; Dorothy Bernard, alto; 9:15, music; 9:30, Panetti Brothers; 9:35, William L. Spittal, tenor; Dorothy B. Hurlow, pianist; 10:05, Hotel Kimball orchestra.
WCAF, Pittsburgh, Pa. (461.3), 6:30 p. m., concert, concert, William Penn hotel; 8, Current Motor topics; 8:30, concert, Philadelphia, Pa.
WCX, Detroit, Mich. (516.3), 4:15 p. m., musical program; 6, dinner concert, Park-Cadillac hotel.
WCAF, New York, N. Y. (497.5), 6 p. m., Hotel Waldorf-Astoria; 7, William Hyatt, tenor; 7:10, Maria Letovone, Rosetta Ellinger, pianist; 7:30, "This and Adventure," Fred J. Tomer; 7:50, William Hyatt, tenor; 8:05, Bobbi Sanderson, soprano; 8:15, Hynes's Feetrest Four; 8:45, Sybil S. Zappert, violinist; 9, Waldorf-Astoria concert orchestra; 9:45, Caterina Gobbi, dramatic soprano; 10, Palladium Sisters trio; 10:15, Caterina Gobbi, soprano; 10:30, Robert Yap Hawaiian ensemble; 11-12, Vincent Lopez and his orchestra.
WFI, Philadelphia, Pa. (384.5), 6 p. m., Roy Elton dance orchestra; 6:30, Mezer David Bellevue Striford concert orchestra; 7, bedtime stories; 8, Cantata, "Cranant Myster."
WGSB, New York, N. Y. (215.6), 6-8:30 p. m., Uncle Gustaf; 8:30-7:30, Canoco (Cantigas); 7:30-8:30, Arnold Freney orchestra; 8:30-9:30, Bob Fawcett; 9:30-10, "Inside Main Chance," Sam Lomb; 9:45-10:15, Philippine sextet; 10-10:15, Christiana Chalmers, soprano; 10:15-10:30, Philippine sextet; 10:30-10:45, Albert Mesrop, tenor; 11-12, Vanderbilt hotel dance orchestra.

WMOF, Miami Beach, Fla. (384.4), 10-3 a. m., Rosebrook's Radio serenaders, Nautilus "Lucky Seven" orchestra.
WNYC, New York, N. Y. (526), 6:30-7 p. m., Sam Wooding's Club Alabama orchestra; 7:30-8, Chateau Four; 8-10, talk by public officials; 8:30-8:45, vocal recital; 8:30-9, Police quartet; 9:15-10, orchestral feature; 10:10-10:20, travel talk, Board of Education.
WFO, Philadelphia, Pa. (508.2), 4:45 p. m., organ recital, Mary E. Vogt.
WFC, Washington, D. C. (468.7), 6 p. m., Irving Boerstein's Washington hotel orchestra; 8, Bible talk; 9, Elizabeth Howson, soprano; 9:15, "Chemical Warfare and Its Relation to the Business of the District of Columbia," Brigadier General Amos A. Fries; 10,

KSO, St. Louis, Mo. (345.1), 7 p. m., dinner dance, City club.
KTHS, Hot Springs National Park, Ark. (374.8), 8:30-10 p. m., Charles L. Fisher Eastern hotel orchestra; 10:10-15, Meyer Davis-New Arlington hotel orchestra.
KYW, Chicago, Ill. (332.4), 6:35-7 p. m., children's bedtime story, Uncle Bob; 7:30, Concerto, Heidi; 8, 8:55, Jennie Mammarie, soprano; E. L. King, baritone; Raymond Schaefer, tenor; Francis J. Valentine, pianist; Stephenson & Hencher, vocal duo; 9:30-11:30, Folger's classic; 11-1 a. m., Congress carnival; 1-2, Anamata club.
WBCW, Chicago, Ill. (266), 7-8 p. m., bedside hour, George R. Cleveland; Dr. S. Wall, saxophonist; Charles Edington, tenor; 8-12, popular program.

Garland, Texas; 8:30-9:30, Forest Avenue high school orchestra; 11-12, Anamata club.
WGN, Chicago, Ill. (370.2), 6 p. m., organ recital, Lyon & Healy; 6:30-7, Drake concert ensemble, Black stone elite quintet; 8:30, jazz quartet; 10-11, Drake hotel dance orchestra.
WHSB, Louisville, Ky. (389.8), 4-5 p. m., Louisville Conservatory of music; Paul G. Clemmow, tenor; Mamie Stephens, accompanist; 7:30-9, Arthur Findlay, baritone.
WJAD, Waco, Tex. (352.7), 10:30 p. m., old home town.
WJLD, Muskegon, Ill. (332.5), 6:30-7:15 p. m., Albert P. Brown, organist; 7:15-8, Movement, Hunter orchestra; 10:30-11 a. m., concert, Grand studio; Charles Strickland and his orchestra; 11-12, Emerica Society of Sleep.
WLS, Chicago, Ill. (344.5), 7 p. m., lullaby time, Ford and Glenn; 7:20, WLS staff review night, Harmony Girls, Walter Peterson, Woodlawn, old time fiddlers, Glenn's Cornshoppers, WLS Harmonium Trio; Stef. Hubschek & Acta of Harmony, Ford and Glenn; 11:15-12, Senate theater review.
WMAQ, Chicago, Ill. (407.5), 6 p. m., program, New Trier high school; 8, Russell Pratt, Fred Paw; 8:30, "Nora Scott," Clarence Honig; 9, weekly Chicago theater review.
WMC, Memphis, Tenn. (489.7), 8:30 p. m., musical program, Hugh Sandberg, director.
WMO, Cincinnati, Ohio (422.3), 10 p. m., Murray Horlons Hotel Alma orchestra; 10:30, Ed. M. Spelver, pianist; popular songs, angelo Novator; Eugene Ferrazo, accompanist; popular songs, Gay Andrews; 11:20, Murray Horlons Hotel Alma orchestra.
WOW, Omaha, Neb. (358), 6 p. m., dramatic hour, David Story of Expression; 6:30, to be announced; 7:45, Willard Robison and his orchestra; 7:30, weekly science, Omaha Chamber of Commerce; 9, program, scientific; Omaha Printing company; 11, Frank W. Katz, Jr., and his Nightingale orchestra; 11:30, Arthur Hays, organist.
WOC, Davenport, Iowa (483.6), 5:45 p. m., chimes; 5:30, sadman's visit, Val McLoughlin; 6:50, Sunday school lesson, Rev. M. A. Getzenbender; 9, musical program, Dr. C. L. Leigh; 11, Louis Connor and his LeClaire hotel orchestra; Peter McArthur, baritone.
WUJ, Chicago, Ill. (447.5), 1-4 p. m., Louis Kistoch; 7-8, Ralph Williams and the Rainco Garden orchestra; LeClaire hotel orchestra; Allen Irwin, pianist; Milton Burdell, baritone; Margaret Snook, accompanist; Zetha Karlov, leader; 11-3 a. m., Ralph Williams and the Rainco Garden; Jerry Sullivan; Harry Quinn; Melvianer; Alfred Tweed, tenor; Eliek and Johnny; Elizabeth guitarists; Bond Theben; Joe Vargas; New Grand Hotel.
WSB, Atlanta, Ga. (428.3), 6 p. m., Sunday school lesson, Dr. Marion Hall; 8-9, Cozyers glie club; 10:45, Bired Help Jubilee.
WTAS, Egin, Ill. (302.8), 8-10:30 p. m., WTAS orchestra.

Mountain Time Stations

The following schedules of programs are given in Mountain time. To change to Eastern time, add two hours; Central time, add one hour; Pacific time, subtract one hour.
KOA, Denver, Colo. (322.4), 9-12 midnight, Joe Mann and his Hainbow-Lane orchestra.

Pacific Time Stations

The following schedules of programs are given in Pacific time. To change to Eastern time, add three hours; Central time, add two hours; Mountain time, add one hour.
KFI, Los Angeles, Calif. (468.5), 5:30-6 p. m., Erasmian's musical hall hour; 6:45-7, Radcliffe talk; 7-7:45, Lake Arrowhead dance orchestra; Mel Lennon, tenor; 7:45-8, The Beckwiths; Nancy; 8-9, Examiner; program by Moorova, Calif., Community Symphony orchestra; 9-10, Dorothy Francis, soprano; Martha (Continued on page 10)

PRIZE FIDDLERS HEARD AT KFMQ

Monday, April 6

(Continued from page 10)

guitar; piano solos Wilbert Little and Gus Ribbed; feature dance program, Bob Dakman and his orchestra.
WMC, Memphis, Tenn. (499.7), 7:30 p. m., farm talk, C. W. Watson; 8:30, Hotel Casino orchestra.
WOAW, Omaha, Neb. (526), 6 p. m., Arthur Hark, organist; 6:30, dinner concert; 9, program, Hansman-Van Brunt concert.
WORD, Batavia, Ill. (275), 7-8 p. m., boys and girls hour, Uncle Dan; 8-10, Welch Tower choral singers; Adelaide Jones, soprano; Esther Arneson, pianist; John T. Reed, bass; "The Birth of Jesus," Calvin Scripps.
WRBC, Valparaiso, Ind. (278), 7:30 p. m., musical and educational program.
WSB, Atlanta, Ga. (428.3), 8-9 p. m., John McCreedy, Scotch bass; Vera Sue Hampton, pianist; 10:45, Warner's Seven Aces.
WSUI, Iowa City, Iowa (483.8), 7:30-7:45 p. m., "Modern Esplanade," Prof. Thomas A. Knott; 7:45-8, "Current Social and Economic Problems," Dale O'Leary; 8, readings.
WTAS, Elgin, Ill. (302.8), 8-10:30 p. m., Villa Olivia night program.

Mountain Time Stations

KOA, Denver, Colo. (322.4), 8 p. m., Fred Schmitt and his Rialto theater orchestra; 8:10, program, Pueblo Commerce club, Thomas A. Christian, director; Arion chorus; Pueblo male octet; double male quartet; "Out Where the West Begins," Frank, Elmer.
KOB, State College, N. M. (348.6), 7:30-8:30 p. m., "Superstition in Medicine," Dr. McBride.

Pacific Time Stations

KFAE, Pullman, Wash. (348.6), 7:30-9 p. m., Herbert Kimbrough, contralto; Lelaina Burns, soprano; The Sage, violinist; "What to See in Venice," Prof. Carl M. Brewster; "Our Moral Duty to Mental De-

Dr. A. M. Harding (below) will direct the old time fiddling concert at KFMQ, Fayetteville, Ark., Monday, April 6. Three prize winning fiddlers from the Ozarks will take part in the program.

Eastern Time Stations

CKAC, Montreal, Can. (410.7), 7:30 p. m., Windsor hotel trio; 8:30, studio concert; 10:30, Harold Leonard's Red Sextet.
KDKA, Pittsburgh, Pa. (309.1), 9:15 p. m., Pittsburgh Athletic association orchestra; 7-15, "Overcoming Racial Prejudice," Dr. John Ray Jones; 8:30, Pittsburgh Advertising club; 9, Brunswick hour of music; 11, Pittsburgh Post studio; 11:30, Grand theater.
WBZ, Springfield, Mass. (332.3), 6:45 p. m., songs, Violet Grayley; 7:45, Charles R. Mestor with his St. James theater orchestra; 8:15, talk, George D. Booth; Mrs. E. B. Hayward, soprano; Vincenzo, tenor; 9, Brunswick hour of music.
WCAE, Pittsburgh, Pa. (461.3), 6:30 p. m., William Penn hotel; 8, program from New York; 8:30, Gold Dust Twins; 9, Eveready hour; 10, Goodrich Silvertown Cord orchestra.
WCAU, Philadelphia, Pa. (278), 7 p. m., Paul Specht's Meddlers; 7:30, N. Snellenburg and company recital; 8:15, Mrs. Clara Zillerson; 8:30, Neutia Meddlers; Mrs. Rowett-Coller trio; 8:55, recital; 9:15, "What We See and Hear in Music," talk, Maude Hanson; 10:30, Charles Verms and his dance orchestra.
WCX, Detroit, Mich. (516.5), 4:15 p. m., musical program; 6, dinner concert, Book-Cadillac hotel; 8:30, musical program; 10, the Red Apple club.

Central Time Stations

WNVC, New York, N. Y. (526), 7-7:30 p. m., studio features; 7:35-8:55, Roosevelt's Radio program; 8:15-8:35, talk by public official; 9-10, studio features; 10:10-10:20, Board of Education lecture series.
WOP, Philadelphia, Pa. (508.2), 4:45 p. m., organ recital, Mary E. Vogt.
WOR, Newark, N. J. (405.2), 6:15 p. m., Hotel Lorraine orchestra; 8:30, "Man to the Moon" stories; Leonard Ball; 8:10, to be announced; 8:30, "The Political Situation in Washington Tonight," Frederick William White; 9, Brunswick hour of music; 10:30, dance music, Meyer Davis' Le Paradis band.
WJL, Detroit, Mich. (352.7), 6 p. m., dinner concert; 8, concert from New York.
KFDM, Bonham, Texas (315.6), 8 p. m., Pierce Goodrich Piano company program.
KFMQ, Fayetteville, Ark. (298.8), 9 p. m., student orchestra, D. C. Hansard.
KFBU, Bristol, Okla. (334.5), 10:30-11 midnight, Jimmie Wilson's Catfish string band.
KFUD, St. Louis, Mo. (345.1), 9:15 p. m., "The Dental of Peter," Rev. E. Dueser.

Mountain Time Stations

CNRB, Regina, Can. (312.3), 8 p. m., Regina Rover Scout band.
Pacific Time Stations
KFI, Los Angeles, Calif. (468.3), 5:30-6 p. m., Exam-st. K's musical night hour; 6:30-7, Radiolocal talk; 7-8, Lucian residence pipe organ recital, Dan McFarland, organist; 8-9, Jane and the Keweenaw; 10-11, a. m., dinner program, American club members; 10-11, Packard billed program.
Arlene Baker is one of the promising pupils of Edwin Swindell, musical director of WOC, Davenport. She gives charming pianoliques at this station and has received so far only sixteen thousand votes of popularity.



Vincent H. Percy, organist of WEAR, Cleveland, who plays the Metcalf Memorial organ every Tuesday and Thursday, knows all about the construction of this great musical instrument because he drew the plans and specifications.

**festiva," Prof. F. W. Clower; Tau Nu Kappa "Boiler-plant," Archer Ridge, pianist; Loy N. Hesser, saxophonist; Earl McCune, trumpet; Ray Truesler, banjoist; "Growing Crops in 1925," Prof. E. C. Schaefer; "Farm Outlook for April," R. M. Turner.
KFI, Los Angeles, Calif. (468.3), 5:30-6 p. m., Examiner's musical half hour; 6-7, Radiolocal talk; 7-9, Evening Herald Radiolocal news orchestra, Charlie Nelson, tenor; 8-9, program, Walter M. Murphy Motors company; 9-10, vocal instrumental; 10-11, Exam-st. Keweenaw and the Alexandria hotel dance orchestra.
KFOA, Seattle, Wash. (454.3), 6:45-8:15 p. m., Sherman, Clay & company program; 8:30-10, Goodrich Silvertown Cord orchestra.
KFWB, Hollywood, Calif. (322), 7-7:30 p. m., dinner dance music; 7:30-8, Maxwell House Coffee string octet; 8-10, KFWB feature program, Bill Monahan's dance orchestra, Charlie Wolfman, tenor; Bill Bach, piano; 10-11, Harry Seymour's hour of fun and frivolity; 11-1 a. m., Deanslatter's Hollywood Montmartre cafe dance orchestra, Sid Fedosky, leader.
KGO, Oakland, Calif. (381), 3 p. m., studio musical program; 4-5:30, Henry Halstead's dance orchestra; 8, Arion trio; "The Origin, Formation and Development of Soil," C. F. Shaw; "How to Get Out of a Rut," Albertine Richards Nash; "Chats About New Books," Joseph Henry Jackson; 10-11 a. m., Henry Halstead's orchestra.
KGW, Portland, Ore. (491.5), 6 p. m., dinner concert, F. W. Goodrich, organist; 7, Pre-East address.
KHJ, Los Angeles, Calif. (405.2), 8-10 p. m., program, Stern and Schick Chemical company, arranged by G. Allison Philips.
KLX, Oakland, Calif. (508.2), 9-7 p. m., organ recital; 8-9:30, educational program; 9:30-10, American theater orchestra; 10, orchestra; 10:30, program, Bill Bach, piano; 10:45-11, Harry Seymour's hour of fun and frivolity; 11-1 a. m., Deanslatter's Hollywood Montmartre cafe dance orchestra, Sid Fedosky, leader.
KPD, San Francisco, Calif. (429.3), 7-7:30 p. m., Rudy Selzer's Fairmont hotel orchestra; 8-9, Theodore J. Irwin, organist; Victor Vogel, bass; 9-10, San Francisco Conservatory of music.**

Tuesday, April 7

Tuesday, silent night for: CFCA, CHNC, CHIC, KFAE, KFAE, KFUD, KFUX, KFNF, KLX, KOA, KOB, WAG, WBAV, WEBB, WRAC, WGED, WEOB, WENG, WGST, WHAZ, WHO, WJAD, WMAK, WOI, WOO, WSAC, WSUI.

WDWF, Providence, R. I. (440.9), 8:30-9:30 p. m., Vincent Lopez Arcadia dance orchestra.
WEAF, New York, N. Y. (491.5), 8 p. m., Hotel Waldorf-Astoria; 7, Claire Brookshire, contralto; 7:15, art talk, American Federation of arts; 7:30, Eagle Neurology trio; 8, talk, Dudley F. Fowler; 8:10, Gold Dust Twins; 9, Eveready hour; 10:11, American organ ensemble.
WEAR, Cleveland, Ohio (389.4), 7-8 p. m., Metcalf Memorial organ recital; Vincent H. Percy; 8-10, program from WEAF.
WEBJ, New York, N. Y. (233), 7-7:30 p. m., Bert Robson's society orchestra; 7:45-8, Eugene Barton, tenor; 8:15-8:30, Don Roberts and Al Pennington, comedians; 8:30-9, Steebers' Midnight serenaders.
WEEI, Boston, Mass. (475.9), 6:30 p. m., Big Brother club; 7:30, A. Lowe, interviewed by Will; 7:30, Dole-Eisenberg and his Sinfonians; 8, from New York; 8:30, Gold Dust Twins; 9, Eveready hour; 10, Goodrich Silvertown Cord orchestra.
WEI, Philadelphia, Pa. (394.5), 8:30 p. m., Meyer Davis' Ballouze Stratford concert orchestra; 7, bedtime stories; 8, concert from WEAF; 8:50, Gold Dust Twins; 9, Eveready hour; 10, Goodrich Silvertown Cord orchestra.
WGBS, New York, N. Y. (315.8), 8-9:30 p. m., Uncle Gus and 6:30-7:30, Jersey colleagues; 7:30-7:50, pliers; 7:50-8:30, travel talk from WJZ; 10:30, Washington Square players under direction of Randolph Sowerby; 8:30-8:45, Scotty Wood, contralto; 9-9:30, Harding House studio orchestra; 9:30-10, program, Harold Trimmer; 10-10:15, J. R. Cooper, bass; Vee Lewentree, pianist.
WGB, Buffalo, N. Y. (319), 2:30-3:30 p. m., Radio Breeze musical program, T. Quinn, director; 6-7:30, dinner music, Hallway string quartet; 8-11, jointly with WEAF, including the Gold Dust Twins and Eveready hour.
WGY, Schenectady, N. Y. (378.5), 6:30 p. m., New Yorker hotel orchestra; 7:30, program, 12 Vacuum Tubes; 7:15, Fred; 7:45, WGY orchestra; "Dramatic Standards," Dorothy Meadows; 9, Brunswick hour of music; 10, travel talk from WJZ; 10:30, Meyer-Davis orchestra, WRC, WJZ; 11:30, Stephen E. Bolscilat, organist.
WHN, New York, N. Y. (361.2), 8:30 p. m., Strand Roof orchestra; 7, WJWam club orchestra; 7:30, health talk, Dr. Landis; 7:35, Will Oakland's Chateau Shanties; 7:45, Fred; 7:55, Harvey Marburg's dance orchestra; 10-11:30 a. m., Parody club revue.
WIP, Philadelphia, Pa. (508.2), 8:05 p. m., baseball talk, Monte Cross; 6:15, Harvey Marburg's dance orchestra; 7, Uncle Wip's bedtime stories; 8:15, Leavore quartet; 8:50, Charles J. Tenney, balladist; 9, Yungy Nancarrow; 10, weekly news broadcast; 10:30, Harvey Marburg's dance orchestra.
WIAR, Providence, R. I. (365.9), 8 p. m., studio program; 9, Eveready hour; 10, Goodrich Silvertown Cord orchestra.
WJL, Philadelphia, Pa. (340.5), 7:30 p. m., Rose Duddy's bedtime stories.
WMBF, Miami Beach, Fla. (384.4), 10-2 a. m., Dream Book's Radio serenaders; Neutia's "Lucky Seven" orchestra.

KSD, St. Louis, Mo. (545.1), 6 p. m., Benjamin Roder's orchestra.
KSHS, Hot Springs National Park, Ark. (374.8), 8:30-9:15 p. m., Myrtle L. Fleisher Estabrook hotel orchestra; 9:15-10:45, Meyer Davis-New Arlington hotel orchestra.
WBAP, Fort Worth, Texas (475.9), 7:30-8:30 p. m., concert, Ruby Wilson; 9:30-10:45, concert, Mrs. Poiri Calhoun Davis.
WBBM, Chicago, Ill. (228), 9-10 p. m., Starburst's Birchwood orchestra; Nate Caldwell, Lew Clark, Vernon Buck, Jack Perry, Ned Santry, Maurice Silverman.
WCCO, Minneapolis-St. Paul, Minn. (418.4), 6:15 p. m., Blevins St. Paul hotel concert orchestra; 7:30, lecture; 10-12, national program.
WCEB, Elgin, Ill. (275), 7-8 p. m., WTAS orchestra; 10:30-12, WTAS orchestra; Frank Morris; Fanny and Eddie Garanzani.
WDAF, Kansas City, Mo. (385.6), 6-7 p. m., Tell-Me-a-Story lady; Maudeline Littlefield, pianist; Trilane ensemble; 1:45-1 a. m., Newman Highhawk night.
WEBH, Chicago, Ill. (370.2), 7-8 p. m., Oriole orchestra; Elsie Clement, pianist; Guy L. Hague, baritone; Riviera theater; 8-10, Oriole orchestra; Dennis Sitter; Frank Marini, Victor Young, violinist; Ted Florio, accompanist; Frank Pacific, accordionist; 11-12, Oriole pianist; Frank Pacific, piano; 11-12, Oriole pianist; Bambi Kennedy, Jack Pennington, twin guitarists; Bertha theater.
WBBW, Beloit, Wis. (268), 8 p. m., program, Fairbanks Morse company; 7:30-8:15, Haulaea School of Hawaiian music; 8:30-9:30, G. Baydlin Jones and soloists; 11-12, Dwight Brown, organist.
WGB, Chicago, Ill. (370.2), 6 p. m., organ recital, Lyon & Healy; 6:30-7, Drake concert ensemble, Blackstone string quartet; 8-8:45, Florence Brower, soprano, Thelma Edwards; 10-11, Drake hotel dance orchestra.
WHA, Louisville, Ky. (399.8), 4-5 p. m., concert, Louisville Conservatory of music; 7:50-9, Carl Goeller's Meddlers.
WJJD, Moseheart, Ill. (302.8), 6:30-7:15 p. m., Althea theater organist; 7:15-8, Moseheart concert band; "Child Care," M. P. Adams; 10:30-11 a. m., Gard school; Charley Straight and his orchestra.
WBL, Dallas, Texas (475.9), 6:30-7:30 p. m., musical program, Audubon Stevens Point Chamber of Commerce.
WLS, Chicago, Ill. (344.6), 6:30 p. m., Ralph Emerson, organist; 7, Jubilee store; 7:30, Bill Footrell, Phil Robison; Grace Wilson; WLS Harmony trio; 8, R. P. D. program; 8, Alice La Parle, pianist; 9:15, WLS theater; 9:30, Alice La Parle, pianist; 10, Seneca Symphony orchestra; 10:10, Nemefool string quartet; 10:30, Glenn Oldmeyer; 10:40, Ford and Glenn Oldmeyer; 11, Glenn Oldmeyer's weekly radio; 12, Ralph Emerson, organist.
WLV, Cincinnati, Ohio (422.3), 4 p. m., pupils of Leo Stofferer and William Kite in recital; auction bridge; 6:30, Alice La Parle, pianist; 10, Seneca Symphony orchestra; 10:10, Nemefool string quartet; 10:30, Glenn Oldmeyer; 10:40, Ford and Glenn Oldmeyer; 11, Glenn Oldmeyer's weekly radio; 12, Ralph Emerson, organist.
WMAQ, Chicago, Ill. (447.5), 6 p. m., Chicago theater organ; 6:35, Telio LaSalle orchestra; 8, Harry Hanson, pianist; 8:50, Mrs. Mary Louise LaSalle; 9:30, lecture, University of Chicago; 8:50, weekly

hour with Ray Watts, Billy and Polly Hill, Dorothy Cleveland, Barney Weber and others.
WMO, Memphis, Tenn. (499.7), 7:30 p. m., studio program, William Targart, director; 8:30-10, studio program, A. M. Turner; 40-11, Eddie Harkness and his orchestra.
KFWB, Hollywood, Calif. (322), 7-8 p. m., instrumental and vocal numbers from light operas; 8-10, movie night; 8-10, musical night hour; 8:30-9, Lucian residence pipe organ recital, Dan McFarland, organist; 8-9, Jane and the Keweenaw; 10-11, a. m., dinner program, American club members; 10-11, Packard billed program.
Arlene Baker is one of the promising pupils of Edwin Swindell, musical director of WOC, Davenport. She gives charming pianoliques at this station and has received so far only sixteen thousand votes of popularity.

Wednesday, April 8

Wednesday, silent night for: CFCA, CHNC, CHIC, CKAC, KFUD, KFUX, KFNF, KLX, KOA, KOB, WAG, WBAV, WEBB, WRAC, WGED, WEOB, WENG, WGST, WHAZ, WHO, WJAD, WMAK, WOI, WOO, WSAC, WSUI.
CFCA, Toronto, Can. (356.8), 8:30 p. m., Toronto Piccadilly hotel.
KDKA, Pittsburgh, Pa. (309.1), 6:15 p. m., Pittsburgh Athletic association; 7:30, Kindergarten good night circle; 8:15, address, University of Pittsburgh; 9, Dry Cleaning hour of music.
WAG, Richmond Hill, N. Y. (315.6), 7-12 p. m., program, Brooklyn Daily Eagle, including musical and dramatic plays.
WBAZ, Springfield, Mass. (433.3), 7:05 p. m., nature story, Thornton W. Burgess; 7:30, lecture, Prof. Andrew Morris; 7:15, Mrs. Margaret MacFarlane, mezzosoprano.
 (Continued on page 12)

Four Filter Eight Tube Super-Heterodyne

Part V—Wiring With Push Pull Amplification

By Jacques Fournier

THE assembly having been completed from Parts III and IV, we are now ready to begin the wiring. Figure 15 is presented to show all wiring which appears above the sub base, while figure 16 shows the wiring below the sub base. If these two drawings are used in conjunction with the schematic diagram shown as figure 2 in Part I, no difficulty should be encountered. It will be found a good plan to put in the filament wiring first and it is suggested that the positive filament bus be the first wire. In figure 15 this wire runs from hole 3 to hole 25, with short wires branching from it at holes 5, 8, 10, 12 and 16, with a wire leading up to hole 21. This bus is to be connected to the filament switch and the other side of the filament switch connects to the second binding post from the right, looking at the set from the bottom, as shown in figure 16. At the same time a short lead can be put in connecting the positive filament binding post to the minus B binding post.

Negative Filament Leads

The negative filament leads can now be put in by connecting a wire from the right hand binding post to the rheostat and another wire from the rheostat down to hole 26, across to 15, then to 11, 9, 7, 4 and 2, with a branch connecting to hole 20. These wires should be insulated with spaghetti tubing to avoid short circuits with high voltage leads which will be put in later.

The next two wires are the longest in the receiver; one of them runs from hole 1 to hole 23, while the other one connects the two-circuit jack at the left end of the base with hole 24. The oscillator coil is mounted with the pickup coil at the bottom, and the second of the two long leads just mentioned passes up through hole 24 and connects to the end of the pickup coil toward the bottom of that coil. The other long wire which passes up through hole 23 connects to the upper end of the pickup coil.

Filter Box Connections

Considering the upper side of the receiver it will be found convenient to connect the

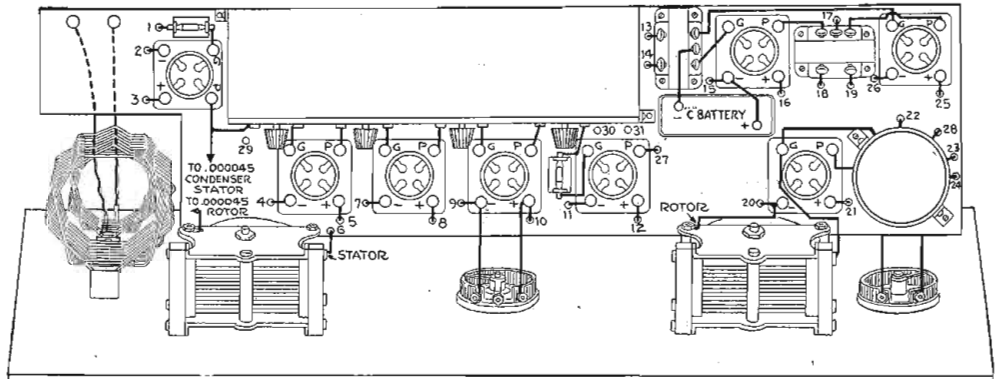


Figure 15

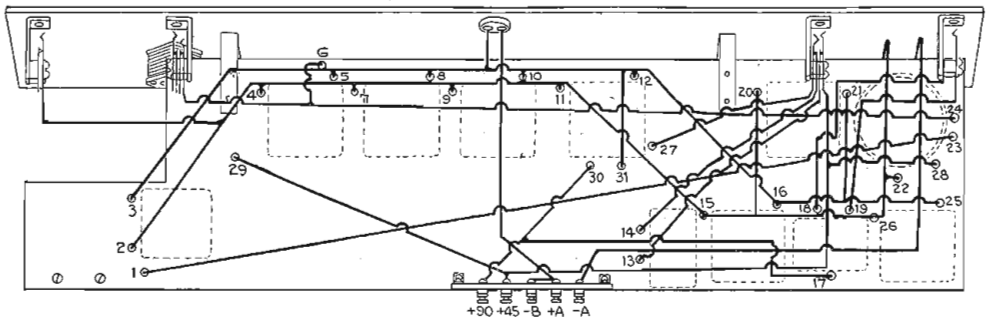
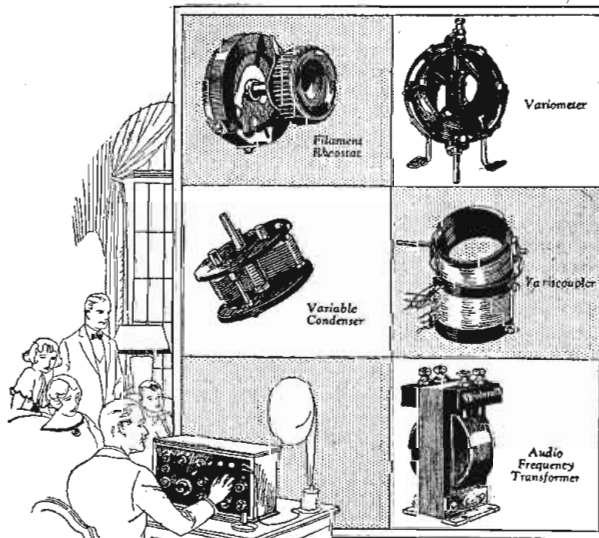


Figure 16

first grid leak and grid condenser to the G terminal of the first detector tube,

which is at the left of the sub base behind P terminal of that socket to the first the antenna coupler. Then connect the (Continued on page 18)



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Your pet "hook-up" needs first quality parts—perfectly matched—to give you real radio. Every Federal Standard Radio Part is designed, made, matched and guaranteed by Federal. That is why you find Federal parts in all the better hook-ups—that is why you should insist on Federal parts when purchasing.

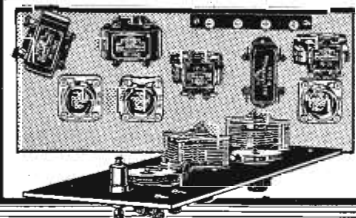
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Vol. XII Saturday, April 4, 1925 No. 13

Automatons for Announcers?

SHORTLY after the inauguration ceremonies, some twenty-minute, cold-storage "egg" wrote to one of the newspapers severely criticizing Graham McNamee who did the announcing from Washington. This person indicated that his ideal of announcers would be one with about as much expression in his voice as an old-fashioned phonograph record. He criticized the announcer's pronunciation, his comment on the proceedings, and his conduct in general.

In the following issue of the paper, which was the Buffalo Evening News, there was a splendid editorial on the subject of announcers. Whether it was designed as an answer to the correspondent does not appear and really does not matter. Anyhow it should effectively answer him and other persons whose ideal in announcers is the machine type. It is called "Robots for Announcers." It may be significant to add that Marc A. Rose, the managing editor of the Buffalo Evening News, is a confirmed Radiophan.

The editorial follows:

"It was perhaps inevitable that a movement would be put under way to standardize the Radio announcer, the distant voice that presides as chairman, or toastmaster, over our broadcastings—which is to say, our aerial entertainment. This is the day of the standardized product, the day of the dead level. So certain persons in the Radio industry come forward with plans and specifications for the announcer. To begin with, he must have a voice of 'low middle range' and be of 'formal but friendly' manner.

"Radiophans would hardly endorse the idea of making automatons of these rulers of the air. The listener in likes in announcers a spice of personality, both of voice and manner. Granted they make themselves easily understood, the fan does not care whether they do their announcing in treble, tenor, baritone or bass. As to the manner of the announcer, let it be what it will, so long as there is individuality to it. A certain few of these who furnish prologue, interlude and epilogue for Radio programs have this quality in marked degree. One looks eagerly to hearing them because they add zest to the entertainment. The fans would keenly resent any attempt to reduce these friends of theirs to a dead level—they would not tolerate robots as announcers."

So ends the dissertation of the editorial writer in the Buffalo newspaper. He is entirely right and has the endorsement of Radio Digest. That is why this publication last year inaugurated its annual Gold Cup Award contest, wherein the people's choice for most popular announcer is awarded a priceless solid gold cup.

The Gold Cup Award is for the building of Radio personality and individuality in announcers. Register your vote for the man possessing the qualities which please you the most and you will find him far from a lifeless automaton.

Scientifically you can specify exactly what might be considered a "perfect" announcer—but you can't make the Radiophans like the product answering such specifications.

People are peculiar—especially Americans—in this regard. They know what they like, but more than likely cannot, or will not, say why or give the reasons. And you cannot "Bertillon" personality.

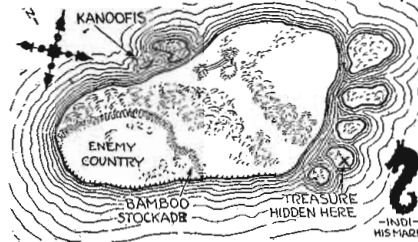
At any rate the second annual Radio Digest Gold Cup Award, which was launched last issue, will afford listeners in an excellent opportunity of telling the world what they like, and, incidentally, squelching the announcer standardization movement.

Luxury for Everybody

WHEN the automobile business started the price of a car was far beyond the reach of the average person. Radio is much different for if you do not have the price of a manufactured set you can build one to suit your needs and funds available. Radio has started at the other end of the scale. It began as an average boy's toy and is ending up as a rich man's luxury as well as a poor man's delight.

RADIO INDI-GEST

Consternation Reigns in Walla Walla



Eagle's-Eye View of Walla Walla—If They Had Any Eagles

WALLA WALLA (Special via Radio).—Mike and Izzy, the two trained chimpanzee antenna raisers, have been kidnapped. A rumor has been circulated around that they have been bribed to work for another station being erected by a hostile tribe living on the same island.

Both these boys are great favorites with the natives of the island and are very intelligent. In fact, they were fired from the Bronx zoo on the same day, less than three feet apart—(we don't know what this proves, but it is a fact nevertheless).

Always willing to work and oblige a person (if you stood over them with a club), they will be sadly missed. Indl claims that he won't miss them with his 30-30 if he sees them first.

The crowd wouldn't mind it so very much, but it happened at a time when the station was about to begin operation. Now we will have to wait until next week for the opening. However, here's a little info that may come in handy to anyone trying to tune to this famous station—BLAH.

The wave length will be 365 2/3 meters (a meter a day—gas or electric, we don't care. The extra two-thirds is for commission). You can only receive this station if you use DUD tubes. Now, we could tell you where to get these tubes, but just to prove that we know the readers of this paper have initiative of their own, we are going to let them figure out for themselves where they can be obtained. (A's us, big hearted alla time.)

Shaka Little, the chief's daughter, will be one of the headliners. She will oscillate at a very high frequency; this was proven during a test. If your tubes aren't Duds, they will be when you get through receiving this program.

He Makes 'Em to Order

A piece of board—some copper wire—
A twisting dial—an old, worn tire—
And I can make you—all a set
That will get Mars—or you can get
Your friends in Heaven—Yes, or Hell—
And sit and hear those old friends tell
How cool it is—or just how hot!
And what they drink there for a "shot"
Ninety dollars gets a set
That reaches 'em—and you can bet
That most of those that I now sell
Are made to reach (not Heaven) but Hell!
Send your order and your check
And I will make her up, by heck!

GEO. A. WRIGHT.

Here's the Words, Get the Air Outside

Dear Indl: An announcer heard the other evening from a small station in Iowa:

"The next thing on the program will be a fiddling trio, well it isn't exactly a fiddling trio, it's a fiddle, a banjo and a piano."
Also: "We got the words for that song, but we ain't got the music."

ADELE B.

My Radio, 'Tis of Thee

My Radio 'tis of thee
Music of air so free,
Of thee I sing.
The trusts for long hath tried
To harness thee, my pride,
Hark! Hear from every side,
Let freedom ring.

My Radio 'tis by thee
Great things to come I see
Thy name I love.
I love thy shocks and thrills
Although it runs up bills;
My wanderings it stills,
Thou art a dove.

Thy music swells the breeze,
It girdles land and seas
With free air song.
Let every fan awake
And of the fight partake.
The trusts designs to break,
Forever on.

Of old our fathers fought,
Liberty was dearly bought;
Lest we forget,
Quit you like men, be strong,
Buckle your armour on,
What if the fight be long,
We'll bust 'em yet.

JAMES E. PEPPERALL.

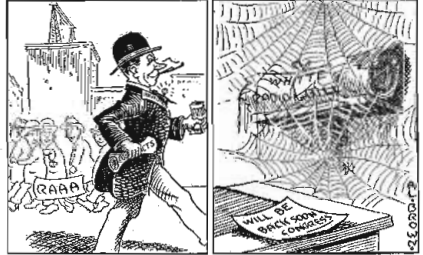
Put Lard in Your Set and You'll Get Greece

Q: I get England, Germany and France, could you please tell me why I can't get Italy.

A: Put a little spaghetti on your lead-in, and I think you'll get it.

N. O. A. LOT.

News Events of the Week



Condensed

By DIELECTRIC

WMH, in Cincinnati, should be listed among those stations exercising care in the choice of program features. The Habanera song was spiritedly sung from this station and on the same program appeared a very competent stringed quartet. We are coming back for more.

WEAF is not to blame for the unpopular "popular" Victor concert, of course, and it is not to them that these remarks are directed. The Victor company is justly looked to for superior musical performances of a high order, not presenting artists whose work could be surpassed with ease by a dozen or more contemporaries. Radio audiences expect to learn of classical music and concert artists comparatively unheard.

One of the most grandiose musical compositions on record is the triumphal march music in the opera of Aida. Always interesting, always inspiring, this number seemed to take a new life the evening I listened to the Little Symphony orchestra of KDKA, Pittsburgh, play it. That orchestra is maintaining its high standards, fortunately.

Most folks listening to dance music have some preference as to numbers, even though so much of the modern syncopation is distinguishable merely in name. To any of you entertaining a special liking for "That's My Girl," I would commend KFI, for nowhere else is it played as in the Pacific coast city of Los Angeles—at least for Radio listeners.

During a short visit to Jefferson City, Missouri, WOS had the adventures of "Hugo" presented to us and it's a pathetic story. One of those multitudinous "request" numbers followed. Mr. Chappel sang "Be-cause" in French. If you don't know why in English, try this!

One of the surprise programs run across once in a while came through Station WHAZ, Troy, N. Y. There we heard the Rensselaer Polytechnic Institute glee club and orchestra in an excellent program of choice selections. Here was a perfectly enjoyable concert from beginning to end, and one not anticipated that evening. Tune to them.

Miami Beach, Station WMBF, hasn't disappointed us as yet with the features presented or manner of announcing. They are fortunate to have the Rosebrook Serenaders on the list of performers. It's a good aggregation and possesses a skilled saxophonist. Listen for him.

From the studio of WEBH, Chicago, there came the pleasing violin concert rendered by Victor Young, a member of the Oriole orchestra. Everybody knows a violin can make dangerous the most placid listener, or quite a nervous dyspeptic—all in the manner of playing, so I hasten to add that Mr. Young must have brought delight to all listeners.

Regardless to what orchestra or band you may listen there never will be an exact duplicate of the United States Marine band. Once in a while the selections chosen are without special interest to you, but surely no one fails to find enjoyment in the Marine band selection, "The Walls of Montezuma." WCAP, Washington, deserves thanks.

A. B. C. Course in Radio Fundamentals

Chapter II—The Electrical Circuit

By David Penn Moreton

THE path in which electricity moves is called the electrical circuit, and it is necessary to have a clear understanding of the fundamental properties of electrical circuits and the various quantities associated with them in order to get a clear understanding of the operation of the many different electrical circuits found in a Radio set. The electrical circuits found in a Radio are of numerous forms, but they all possess, to a very great degree, the same general properties and involve the same quantities. For example, the filament circuit of an ordinary vacuum tube, as shown in figure 4. This circuit is quite typical of all electrical circuits. It contains a source of electrical energy—the storage battery—an energy transforming device—the filament where electrical energy is transformed into heat energy; and the necessary connecting wires. It must be remembered at all times that the electrical circuit is closed on itself and like the circumference of a circle, it has no beginning nor end. When there is a movement of electricity

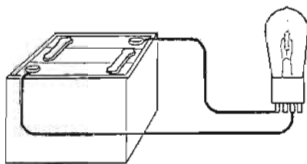


Figure 4

in an electrical circuit, there is said to be a current of electricity in the circuit. The exact nature of electricity is not known, yet the laws governing its action under definite conditions are quite well known, just as the laws of gravitation are known, yet we do not know the constitution of gravity. The laws which explain the operation of the majority of electrical circuits are very similar to the laws which explain the flow of a liquid in a line of pipe or hydraulic circuit. On account of the similarity of the two circuits, and

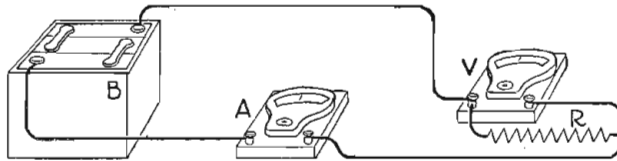


Figure 5

also on account of the laws governing the operation of the ordinary hydraulic circuit being quite obvious, simple hydraulic analogies will be used to illustrate what is supposed to be taking place in the electrical circuit.

Direct Current Flow

When the movement of electricity in the electrical circuit is in one direction there is said to be a direct current in the circuit. Such a current is produced by a battery or direct-current generator. When the movement of electricity is alternately in opposite directions, there is said to be an alternating current in the circuit. The laws governing the alternating current are quite different than the laws for the direct current. The discussion in this chapter will be confined to direct currents and the alternating current and its laws will be discussed later.

According to the electron theory of electricity there is a movement of something in the electrical circuit, yet this movement is not identical to the movement of a liquid in the hydraulic circuit. The electron theory will be discussed later.

The flow of water in a hydraulic circuit is usually expressed as so many gallons per minute, so many cubic feet per second, or any combination of volume and time units. The movement or flow of electricity in an electrical circuit is likewise expressed as so many units of quantity of electricity in a unit of time. The unit of quantity of electricity is called the coulomb. When there is a uniform flow of electricity of one coulomb through an electrical circuit in each second, there

is said to be a unit of current of electricity in the circuit. This uniform rate of movement of electricity of one coulomb in each second is called an ampere.

Resistance in Circuits

The movement of a liquid through a pipe is opposed by a certain amount of opposition or resistance. Likewise there is a certain amount of opposition offered by the electrical circuit to the free movement of electricity around the circuit, and this opposition is called the resistance of the circuit and it is measured in a unit called the ohm. The resistance offered by vari-

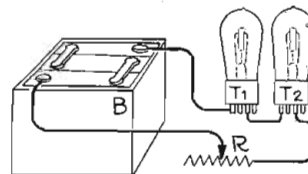


Figure 6

ous materials to the passage of electricity through them varies between wide limits. Those materials which offer a relatively low resistance, such as the metals, are called conductors; while those materials which offer a comparatively high resistance, such as glass, rubber, bakelite, porcelain, dry paper, etc., are called insulators. The terms conductor and insulator are only relative, as all materials will

conduct to some degree even though they are called insulators.

The electrical pressure—sometimes called the electro-motive force, electricity moving force, voltage or drop in potential—causes the electricity to move in the electrical circuit when the circuit is closed. The electrical pressure is measured in a unit called the volt. There are a number of different ways of producing an electrical pressure, but the two most common methods are by chemical action in the battery and by electromagnetic induction in the generator, both of which will be described later.

Many years ago a scientist by the name of Ohm experimentally discovered that there was a definite relation between the resistance of an electrical circuit, the

(Continued on page 20)

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SIMPLICITY, elimination of intricate operation is the great demand of radio users. Radio has graduated into an established industry where users do not expect to know the technical working of radio apparatus any more than they do an automobile, but do demand perfection in entertainment, consistent operation and comfortable simplicity in selecting and tuning in stations. **Meco** Radio Receivers answer these new standards as well as the old ones of selectivity, range, volume and clarity of tone.

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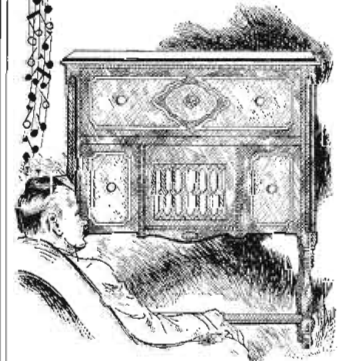
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FOUR FILTER SUPER

(Continued from page 15)

terminal in the lower row on the filter box, which has been designated P1. The connections shown in figure 15 leading to the filter box all connect to the terminals in the lower row. The connections for the terminals in the upper row are shown in figure 17. In figure 15 it will be noted that there are no wires leading down through holes 29, 30 and 31. References to figure 17 will show the wires that pass down through those holes. Figure 16 shows where these three wires

connects to the grid of the oscillator tube as shown in figure 15, and its connection is continued around the circular part of the socket and up to the stator plates of the oscillator condenser C2. The lower end of the plate coil connects by a short wire directly to the P terminal of the oscillator tube socket.

Part of the connections at the left end of the panel and sub base have had to be omitted for clearness, as otherwise there would be too many wires and it would be impossible to follow them. Reference to figure 2 should make this wiring clear and it will be seen that the two

transformer are run down through holes 13 and 14 and connect to the two short springs of the double circuit jack. One of these input terminals is marked P, so be sure that it connects to the short spring which makes contact with the long spring connected to the plate of the second detector tube when no plug is inserted. Next connect the two outer terminals on the output side of this first transformer to the grids of the amplifier tubes as shown in the upper right hand corner of figure 15. The center terminal on this output side connects to negative on the C battery, while the plus side of the C battery is connected to the negative filament circuit at the point where a wire comes up through hole 15.

The two outer terminals on the input side of the second transformer are to be connected to the plates, while the center terminal drops through hole 17 and, as shown in figure 16, connects to the plus 90 binding post beneath the sub base. It will be noted in figure 16 that this wire from the plus 90 binding post also goes up through hole 30 and, as shown in figure 17, connects to B plus 2, B plus 3 and B plus 4. To complete the audio frequency circuit, wires are dropped from the output side of the second transformer through holes 18 and 19, which, as is shown in figure 16, go to the spring and frame of the open circuit jack at the right hand end of the panel. The grid return on the second detector tube is shown in figure 17 as a wire from F4 which is to drop through hole 31 and, as shown in figure 16, connect to the plus filament bus beside hole 12.

The oscillator coil shown in figure 15 is the type wound on a solid tube. If the low loss coil was made, two U-shaped pieces of heavy brass are connected to the ends of the bakelite or hard rubber strip, one at the top and one at the bottom and also to the front panel, so that this coil will be supported in the same position as that shown for the solid tube coil. Since the average rheostat is not more than 1 1/2 inch deep this coil will clear the rheostat by at least 1/2 inch.

Grounding Filter Box

As can be seen in figure 15, the filter box is held in position by two small right angles, one at the rear left hand corner and one at the front right hand corner. The machine screw which holds this right angle at the front right hand corner passes through the sub base and is secured on the underside by a hexagonal nut. The filter box is grounded by connecting this machine screw to the nega-

tive filament bus which passes it about 1/4 inch to the right. In addition to being bolted to the filter box, this right angle should also be soldered to it to make a good electrical connection.

The connection between the grid returns of the intermediate transformers and the center binding post of the potentiometer is not shown in figure 15. Figure 17 shows P1, P2 and P3 connected together and this wire is to be bent forward so that it passes just to the left of the third intermediate tube socket which will bring it right in line with the center terminal of the potentiometer to which it is connected.

Fixed condensers, with the exception of grid condensers, have not been shown in any of these diagrams as they would, in place, obstruct the view of the wiring and make it too complicated to follow. Condensers C10 and C11 are two of the .5 mfd. bypass condensers and they may be secured either to the back of the front panel on each side of the potentiometer or may be fastened to the upper or lower side of the sub base close to the potentiometer. The third .5 mfd. bypass condenser is condenser C9 in figure 2. C14 is the .005 mfd. fixed mica condenser, while C8 is the .002 mfd. fixed mica condenser. C14 and C8 can be attached to the wiring on the underside of the baseboard toward the right end of the panel and supported by their connections to the wiring.

The more experienced experimenter will doubtless now be able to adjust and operate the receiver by himself but for those not so familiar with this work the details on adjusting the filters, with instructions for tuning, will be presented next week. A picture layout for the connections, when two stages of audio are used instead of push pull, will also be shown. For those who have not as yet laid out the sub base it should be stated that in figure 11 the distance from the right edge of the sub base to the center of the output audio transformer should be 3 1/4 inches instead of 4 1/4 inches as shown in upper right corner.

(The wiring as explained above is identical in every respect with that in Mr. Fournier's own set. The method by which he adjusted the intermediate amplifiers when demonstrating this set to the editors will be presented just as clearly in the next article.—Editor's note.)

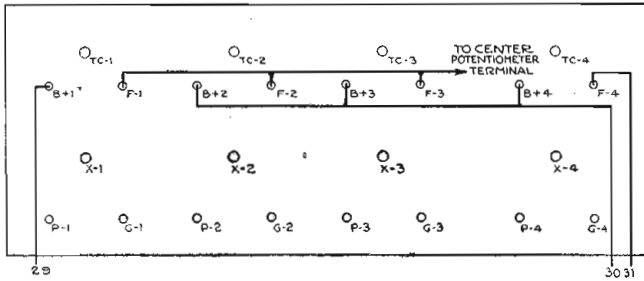


Figure 17

lead below the sub base. The wire from hole 29 runs to the plus 45 binding post, which is the second from the left, and is continued across to the right and then forward to one of the long springs on the double circuit jack, which is in the plate circuit of the second detector tube. It will be noted in figure 16 that a wire is tapped off which passes up through hole 28 to the oscillator coil.

Oscillator Coils

The plate coil is the center of the three coils wound on and this wire leading up through hole 28 connects to the upper end of this plate coil. Figure 2 shows the rotor plates of the oscillator condenser connected to one end of the grid coil and also to the negative filament lead. In figure 15 the rotor plates are connected to the negative filament where it comes up through hole 20 to the negative terminal on the oscillator tube socket. The grid coil is the topmost of the three coils wound on and its lower end is dropped through hole 22 to connect to the negative filament connection as shown in figure 16. The upper end of the grid coil

ends of the secondary of the antenna coupler connect to the two short springs of the double circuit jack, while the center tap on the secondary of the antenna coupler connects to the single short spring on the closed circuit jack. The rotor plates of the midget condenser of .000045 mfd. capacity. In addition to connecting with the rotor plates of the loop condenser, as indicated in figure 15, also connect with the long spring of the two circuit jack, for which no connection is indicated in figure 16. The wire from the plate of the second detector tube which passes down through hole 27, and is the only wire remaining which carries any Radio frequency current, connects to the remaining long spring of the double circuit jack to the right.

Audio Frequency

With all the Radio frequency leads now in, and presumably placed up close against the under side of the sub base, the audio frequency leads can be put in and so bent that they will be about 1/2 inch below the sub base, where they are underneath. The input terminals of the first push pull

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Audio Frequency Amplifier Tube Couplings

Combinations Are Often Desirable

By William Alexander

WHEN designing a set the reader has the choice of many different varieties of Radio frequency amplification; as it is done in the Neurodome, the Hetduogen, super-heterodyne or tuned

range. Very little space has been devoted in most of the Radio periodicals to amplification of signals after they have passed the rectifying detector and are direct current pulsations.

set is not always the most efficient on another. The system most commonly used is that of transformer coupling, with resistance coupling rapidly gaining in popularity. Push pull amplification, while a variety of transformer coupling, is used exclusively as the last stage of an audio frequency amplifier and may be used with either of the above mentioned systems.

Signals in the plate circuit of the detector tube consist of direct current pulsations varying in frequency from 16 to about 15,000 per second. If these pulsa-

Transformer Coupling

Taking up transformer coupling first, we find that the chief unit used is the audio frequency transformer. This consists of a core made up of either flat strips of iron or iron wire on which is wound several layers of fine wire, known as the primary, because the energy is put into this winding. The secondary, from which the energy is taken, also consists of many layers of fine wire, the number of turns depending on the ratio desired. This ratio of turns between secondary and

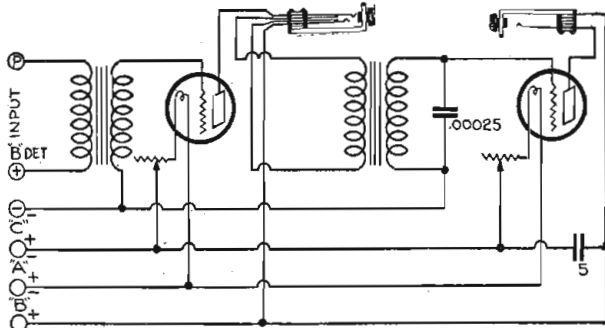


Figure 1

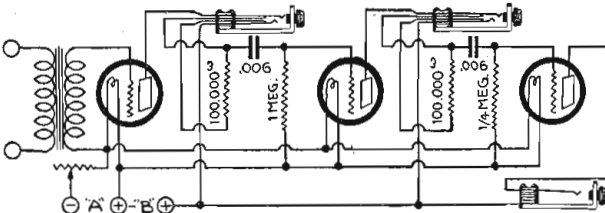


Figure 2

Radio frequency. During the past Radio season most of the attention has been paid to Radio frequency amplification, to increase selectivity and gain greater

The writer proposes to present several methods of audio frequency amplification, and combinations of those methods, as the combination which works well on one

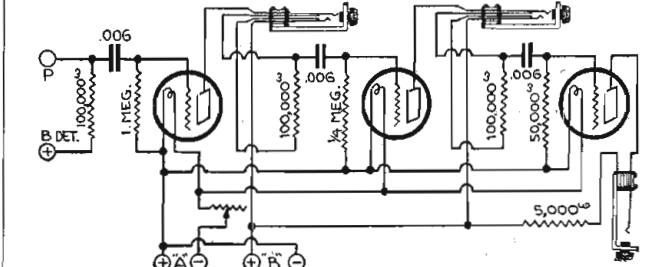


Figure 3

tions are passed into a pair of head receivers they will be clearly heard, but will be comparatively faint. Strengthening of this energy is desirable, so that it will operate a loud speaker, and audio frequency amplification is the means resorted to for raising the strength of the energy sufficiently to operate a speaker.

primary is usually anywhere from 2 to 1 up to 6 to 1. A steady uni-directional current flows from the B battery, keeping the plate of the detector tube at a constant positive voltage in relation to the filament. Since only the changes or variations in a current are passed by a trans-

(Continued on page 20)

The Maker's Name-- A Public Promise

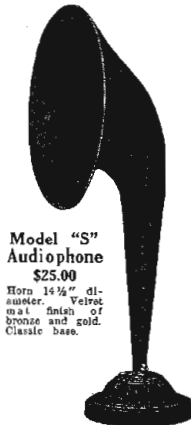
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A. B. C. RADIO COURSE

(Continued from page 17)

electrical pressure acting in the circuit and the electric current produced in the circuit when the circuit was closed. His experiments disclosed the facts that, first the electric current increased and decreased with an increase and decrease in the electrical pressure, and second, that there was a decrease in current if there was an increase in resistance and conversely there was an increase in current if there was a decrease in resistance.

The value of the units in which current (the ampere), resistance (the ohm) and electrical pressure (the volt) are measured are so chosen that the current in an electrical circuit in amperes is equal to the electrical pressure in volts divided by the resistance in ohms. This relation may be written as follows:

$$\text{amperes} = \frac{\text{volts}}{\text{ohms}} \dots\dots\dots I$$

The current is usually represented by the symbol I, the electrical pressure by the symbol E and the electrical resistance by the symbol R. The above relation may be written by using these symbols and we have the following:

$$I = \frac{E}{R} \dots\dots\dots II$$

This relation between current, electrical pressure and resistance is known as Ohm's law because, as stated above, it was discovered by Ohm.

The above relation may be written in several forms as follows:

$$\text{Ohms} = \frac{\text{volts}}{\text{amperes}} \dots\dots\dots III$$

$$R = \frac{E}{I} \dots\dots\dots IV$$

and volts = amperes x ohms ... VI

$$E = I \times R \dots\dots\dots V$$

Ohm's law is perhaps the most important law in the many applications of electricity and a clear understanding of its application to a few fundamental circuits will be useful to the inexperienced.

Instruments to Measure Current

The instrument marked A in figure 5 is called an ammeter because it is used to indicate the value of the current in the circuit in which it is connected. An ammeter is usually of low resistance and its operation depends upon some effect of the electric current such as the heating effect, magnetic effect and chemical effect. The instrument marked V in figure 5 is called a voltmeter because it is used to indicate the difference in electrical pressure between the points on the electrical circuit to which its terminals are connected. A voltmeter has a high resistance as compared to an ammeter and its operation depends upon some effect of the electric current as in the case of the ammeter. A description of the common forms of ammeters and voltmeters will be given in a later chapter.

If the resistance of a certain coil of wire is known to be 1/2 ohm and this coil is connected to the terminals of a storage battery as shown in figure 5, whose electrical pressure between its terminals is 6 volts, the current produced in the coil can be determined by making use of relation I above, namely the current in amperes is equal to the pressure in volts divided by the resistance in ohms.

$$\text{amperes} = \frac{6 \text{ divided by } \frac{1}{2}}{12}$$

A resistance is usually represented by a symbol such as the one marked R in figure 5. Such a symbol represents what is known as a non-inductive resistance, and an inductive resistance will be explained in a later chapter.

If a storage battery having a pressure of 6 volts between its terminals produces a current of 2 amperes in a coil of wire connected to the terminals, the resistance

of the coil can be determined by making use of relation III above, namely, the resistance in ohms is equal to the pressure in volts divided by the current in amperes.

ohms = 6 divided by 2 = 3
If the resistance of a certain circuit is 10 ohms and it is desired to produce a current of 2 amperes in the circuit then the electrical pressure required can be determined by making use of relation V above, namely, the electrical pressure in volts is equal to the current in amperes times the resistance in ohms.

volts = 2 times 10 = 20
The resistance of any conductor depends upon the kind of material composing the conductor, the dimensions of the conductor and also the temperature of the conductor. The resistance offered by a conductor depends upon the nature of the current it is carrying, that is, whether the current is a direct current or an alternating current. The resistance of a conductor to an alternating current is greater than it is to a direct current. The following discussion will be confined to direct current considerations and the alternating current effect will be discussed at a later time.

Conductors of Electricity

Silver is the best conductor but on account of the cost, and lack of supply it is not generally used. Copper offers very little more resistance to the electric current than silver and since it is much cheaper and more plentiful it is generally used. Other metals such as tungsten, zinc, tin and iron, offer a greater resistance to the electric current than copper does.

The greater the length of a conductor the greater its resistance and conversely the shorter the conductor the lower its resistance. The resistance of a conductor increases as the area of its cross-section decreases and conversely its resistance decreases as the area of its cross-section increases. Thus a conductor 100 feet long and 1/8 inch in diameter will have one-fourth the resistance of a conductor of the same material and same length but only 1/16 inch in diameter, because the area of the larger conductor is four times as great as the area of smaller conductor.

The resistance of materials changes due to a change in temperature. Some materials experience an increase in resistance with an increase in temperature such as silver, copper, iron, tungsten, etc., while some other materials experience a decrease in resistance with an increase in temperature. The best example of which is carbon. For example a tungsten-filament lamp has less resistance when it is cold than it has when it is hot, and a carbon-filament lamp has a greater resistance when it is cold than it has when it is hot.

When a tungsten-filament lamp is turned on it lights up almost instantly and it is more brilliant at first than it is later when the resistance of the filament has had time to increase and thus reduce the value of the current. The carbon-filament lamp lights up less rapidly as the resistance of the filament is a maximum when cold and this resistance decreases with an increase in temperature allowing a greater current to pass through the lamp.

Series Electrical Circuit

A series electrical circuit is one in which all the various parts of the circuit

are connected together in such a manner that there is only one path for the current. Thus in figure 6 there are two tube filaments, T₁ and T₂ and a rheostat R connected in series to the terminals of the storage battery, and the same current passes through each part of the circuit. The resistance of such a circuit is equal to the combined resistance of the various parts of the circuit such as the filaments, rheostat connecting leads, etc. The two important facts about a series circuit are

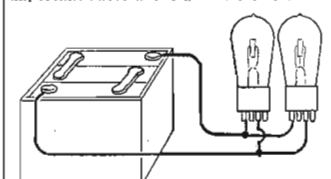


Figure 8

as follows: First, the electrical current at any instant is exactly the same in every part of the circuit. If an ammeter be connected in circuit at various points in the circuit it will indicate the same current provided there is no change in the resistance of the various parts of the circuit. There is no accumulation of electricity at any point in the circuit and just the same amount of electricity returns to the storage battery or source of electrical pressure as leaves it. Thus in figure 6 there is the same current through the filaments of the two tubes. Second, the electrical pressure acting in a series circuit is distributed around the circuit in direct proportion to the resistance.

If the filaments of the two tubes in figure 6 have the same resistance the electrical pressure of voltage between the terminals of the two filaments will be the same. All of the electrical pressure produced in the battery is not used in producing current in the two filaments but a part of this pressure is required in overcoming the resistance of the rheostat, the connecting wires, etc. The resistance of the connecting wires is usually very small in comparison to the resistance of the remainder of the circuit and may be neglected in the majority of cases without serious error. If the resistance of the rheostat be increased, there will be an increase in the total resistance of the circuit and hence a decrease in the current. Likewise a decrease in the resistance of the rheostat will result in a decrease in the total resistance of the circuit and hence an increase in the current. As the resistance of the rheostat is decreased a larger part of the total electrical pressure of the battery will exist between the terminals of the tube filaments. In all cases the electrical pressure between the terminals of any part of the series circuit will have the same relation to the total electrical pressure as the electrical resistance of this portion of the circuit bears to the total resistance of the entire circuit.

A parallel electrical circuit is one in which the various devices are so connected that there are as many paths for the current as there are devices in series.

Thus in figure 7 two resistances R₁ and R₂ are connected in parallel to the terminals of the dry cell. In figure 8 the filaments of the two tubes, T₁ and T₂ are connected in parallel to the terminals of the storage battery B. The current in each branch of a parallel or divided circuit is independent of the current in the other branches and depends upon the resistance of that branch, and the electrical pressure acting on that branch. In order to easily determine the resistance of a parallel circuit, use is made of a property of a circuit called its conductance which is equal to the reciprocal of the resistance of the circuit. Conductance is measured in a unit called the mho which is the ohm spelled backward.

For example, if two resistances of 4 and 6 ohms, respectively are connected in parallel their combined resistance may be determined as follows: The conductance of the 4-ohm branch will be 1/4 mho and the conductance of the 6-ohm branch will be 1/6 mho. The combined conductance of the two branches will be equal to 1/4 plus 1/6 or 5/12 mho. The reciprocal of the total conductance of 5/12 mho will be the value of the resistance of the parallel circuit which will be equal to 12/5 or 2 2/5 ohms. The resistance of a parallel circuit of any number of branches may be determined in this way.

(Magnetism, Electromagnetism and Electro-magnetic Induction will be the subject of our discussion in the next chapter.—Editor's Note.)

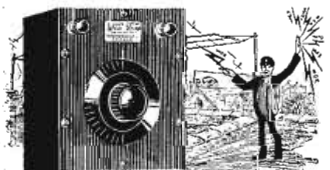
A. F. TUBE COUPLINGS

(Continued from page 19)

former from its primary to its secondary this steady current from the B battery does not of itself cause any effect in the secondary. If incoming signals cause this current to vary above or below the constant voltage, the changes cause currents to be induced in the secondary winding. In a 4 to 1 ratio transformer, where the secondary has four times as many turns of wire as the primary, the voltage in the secondary will be four times that of the change which caused it, originating in the primary.

A two stage transformer coupled audio frequency amplifier is shown in figure 1, page 19. The points to be especially noticed are the C battery and the .5 condenser from the B plus lead to the negative A. With tubes of the 199 and 201-A class a C battery is necessary to perfect reproduction when B battery voltages greater than 45 volts are applied. Since it is desired to keep the grids of the amplifier tubes negative in relation to the filament, the negative side of the C battery is always connected to the grid, while the positive side of the C battery is connected to the negative side of the filament circuit. The .5 mfd. condenser has been found to be of great aid in keeping Radio frequency oscillations out of the audio frequency stages. The fixed condenser of .0025 capacity will be noted across the secondary of the second audio frequency transformer. The use of this condenser may very slightly cut the volume, but clears up whatever distortion or "fuzziness" there may still be in the loud speaker.

(Continued on page 22)



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When using loud speakers that require a field current it is quite bothersome to disconnect it every time, and many times it is forgotten and thus the battery is

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run down and must be re-charged before the set can be used again. With the old types of loud speakers no means have been provided for to disconnect the current, and it has been quite difficult for the amateur to arrange a means of controlling this current.

In the illustration is shown a simple switch for controlling the field current, it being turned on every time the plug which connects to the loud speaker is placed into the jack. Usually the jack, which is used for the loud speaker, is seldom used for the phones, and this means should prove convenient, especially to those who have found it difficult to arrange a switch. The jack used should be either the single or double circuit filament control type and should be quite heavy, with a stout spring for the current control, so that no arc will form when the current is broken.—Evermont Fisel, Lebanon Junction, Kentucky.

Aerial and Ground Condenser

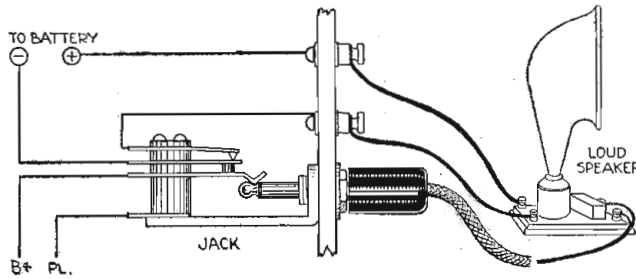
Interference from local stations can be decreased in many cases by shunting a fixed condenser across the aerial and ground binding posts. This type of condenser may be made with two sheets of tin-foil, 3 inches square, separated by a sheet of paper. A permanent unit of the mica dielectric type condenser type, having a capacity of .000025 mfd. should be installed.

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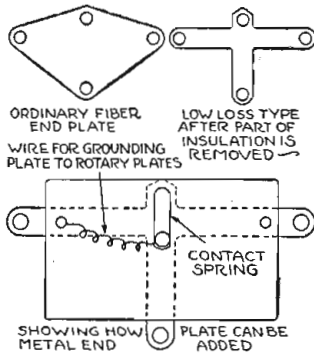
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CIRCUIT JACK WITH DIAGRAM



Low-Lossing the Condenser

Low loss condensers put pep in the set. They make it selective, easy to tune and often eliminates body capacity. If you have any condensers that are not of the low loss type you can convert them into such by a little work on them. For a long time I was under the impression that a low loss condenser had a very minimum amount of insulation. The first condenser I bought of this type



dispelled the idea completely. The low loss condenser has a return for the magnetic field in the form of metal end plates—at least most types have, and a small amount of hard rubber insulation.

In converting a regular condenser to a low loss type, two things are necessary to make a complete job of it. First, cut

away as much of the insulation as possible without damaging the condenser. Next, make metal end plates of aluminum, copper, or zinc, taking care that they are insulated from the stationary plates and ground them to the rotary plates. The easiest method of grounding them is to run a lead wire to the binding post at the back of the condenser.—C. L. Smith, Jackson, Miss.

Centering Instrument Shafts

Procure a piece of medium stiff paper with one straight edge and of any convenient width with a length to reach around the circumference of the rotor or stator. Lay the paper around the part to be marked and cut the ends just so that they will touch—must not overlap—thus forming a length exactly equal to the circumference. Remove the strip and fold it in the exact center. The crease at the fold is marked. Replace the strip as before. The straight side of the strip at the points where the ends meet and where the center was marked are diametrically opposite and form the exact center point where the shaft passes through the rotor or stator.—John Odill, Norway, Mich.

Counterpoise Aids Tuning

If you happen to have two aerials on the roof try one of them as a counterpoise. Simply disconnect your regular ground from the set and in its stead put the lead-in from the other aerial. The aerials do not necessarily have to be arranged one above the other.

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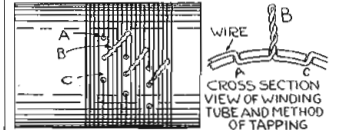
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Coils Kept Tight on Tube with Wire Ends

When winding a coil on a tube and taps are wanted the difficulty arises in keeping the wire tight after the loop is made. The illustration shows a way to do this and when the coil is complete it is not necessary to have any binding material. At the place where the tap is to be taken off three holes are drilled in line with the direction of the wire and the wire is run down through the hole



at A and brought up through the center hole. In order to do this the wire must be cut and the start or new end run down through the hole C and up through the center hole and both ends twisted at B.—M. Daugard, Syracuse, N. Y.

Too Much Expected

The one great evil which prevails today is the endeavor on the part of the individual tuning the set to get the loudest signals possible regardless of clarity. Much has been said about quality being the main consideration in a Radio set, but as we listen to some sets we feel sure this is only a secondary consideration. Much depends on the loud speaker unit itself. Some units will stand up and give good quality on strong signals, while it is important in others that they are not pushed to the limit. Don't strive to get the last drop of power from a set. Don't force the tubes nor use too much regeneration. Good quality will give you the enjoyment you should have from your Radio set.

To take the tinny sound out of a metal loud speaker horn, immerse it slowly with a mixture of hot paraffin and salt to which a little vinegar has been added to make it adhesive. When the horn cools apply several coats of black paint.

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Questions and Answers

Winding a Coupler
(12889) JMcC, Nashville, Tenn.
I have a homemade coupler that does not work very well. I would like to get a little information on the proper way to wind it. The aperiodic primary and the secondary are wound on a tube 3 1/4 inches outside measure and the tickler on a tube 2 3/4 inches outside measure and 2 inches long. The primary has 29 turns and is spaced from secondary 1 1/4 inches. The secondary has 38 turns and the tickler has 26 turns. The secondary is shunted by a 23-plate condenser. The set will tune to about 475 meters. I want to re-wind coils so they will tune from 200 to 550 meters. Will you please tell me the proper numbers of turns for the coils. I want to use number 22 wire.

A.—For the wave length you wish to cover having the aperiodic primary the following number of turns is correct. Six

turns on the primary, 40 turns on the secondary, and about 20 turns on the tickler. With a .0005 condenser you will have no trouble covering the range.

Tuning to Higher Waves
(12878) SDG, Grayville, Ill.
I have a Freshman Masterpiece. It is loud and I get distance and volume, but I am unable to get any station with a wave length higher than 484 meters, and as I like to get KSD and KYW, I would like to find some way to bring the tuning capacity of my set up to 550 meters. I can tune in the lowest. I thought maybe a condenser across the aerial and set would do it, but it did not help.

A.—In answer to your question, we wish to advise that a small fixed condenser across each one of the tuning condensers will help you tune to the higher waves.

Crystal in R. D. 125
(12459) CGD, Coin, Iowa.
Will R. D. 125 tuned Radio frequency diagrammed in the December 30, 1924 issue work successfully and be selective? I have made one but the crystal only works a short time then it quits. I leave it for a day or two then maybe it will work for a short time and then quit. The crystal worked good in a small set at any time. The three coils and three condensers are equally divided on the panel and was wired as directed. I have traced each wire time and again to make sure. Is it possible for parallel wires to have any effect on it?

A.—The trouble in your case is most probably not the crystal but the battery. The battery in all probability is run down and when allowed to stand for a while it picks up again but soon after dies when put to use again.

Double Antenna
(12890) LY, Mound, La.
I have substituted a double wire antenna for my single. My signals now come in almost too strong at times and it is harder to tune out interference. Can I install a single wire beneath the double, and on the same poles, with separate lead-in, so I may use either one giving best results under different weather conditions, without the one not in use interfering with the other. If so, how far beneath the double should the single wire be run?

A.—It is possible to put up another antenna below the one you now have at a distance of 3 or 4 feet. If the signals come in too strong use less amplification.

When a storage battery fails to take a charge, it is an indication that it needs to be overhauled at a battery station.

A. F. TUBE COUPLINGS

(Continued from page 20)
The second form of coupling now in more or less general use is resistance coupling, the outstanding superiority of which is the quality of the output. It is an inherent defect of a transformer that it cannot equally amplify all frequencies and certain frequencies are passed more

efficiently than are others. While remarkable strides have been made in the perfecting of audio transformers they are still not perfect and the chief claim of the resistance coupled method is the perfect reproduction secured. A resistance coupled amplifier can be adjusted to a point at which there is no distortion of any audible frequency and all frequencies are passed equally well. There is less amplification per tube where the resistance coupling is used, but to offset this slight disadvantage there is the purity of reproduction and the fact that there is less B battery current draw. As to actual cost, three stages of resistance coupling cost just about the same as two stages of transformer coupling, both as to initial investment and upkeep.

In figure 2 is a circuit using one stage of transformer coupling and two stages of resistance coupling. This is a very popular arrangement which gives excellent quality with a very low amount of distortion. The question will at once come up in the reader's mind that if there is no distortion in resistance coupling, how many stages can be used efficiently. It will be found that four stages can be used behind a regenerative detector, and behind a circuit using one stage of Radio frequency amplification and a detector,

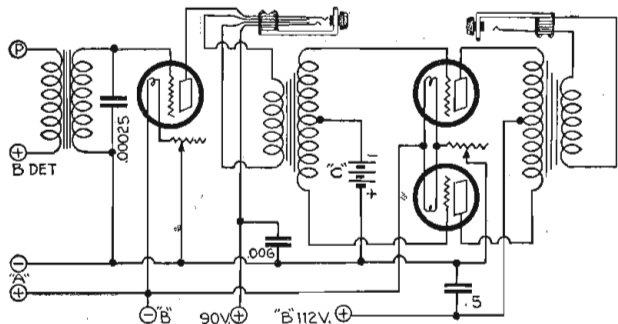


Figure 4

but where two stages of Radio frequency amplification are used, or with a super-heterodyne or reflex, the use of more than three stages of resistance coupling is not to be recommended. It can be done, but complications are likely to follow. Figure 3 shows a resistance coupled amplifier with the necessary jacks for plugging in the phones after either the first or second stage.

Push Pull
When powerful local signals are being received, and either of the above methods are used, it frequently happens that the last tube cannot handle the volume of energy delivered to it, which brought about the use of push pull amplification. While two tubes are used in such a unit they act as one stage and both halves of the cycle are utilized. Since the energy is great, and high plate potentials are always applied to such a unit, a C battery is essential to biasing of the grids. The amount of amplification from a stage of

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push pull is not apt to be as great as is to be obtained from a single stage using a 5 to 1 transformer, since the ratio of push pull transformers is usually about 2 to 1 or 2 1/2 to 1. However, the reproduction will be far clearer and there will be considerable amplification because of the 2 to 1 ratio and the amplification constant of the tubes, which may be anywhere from 5 to 10.

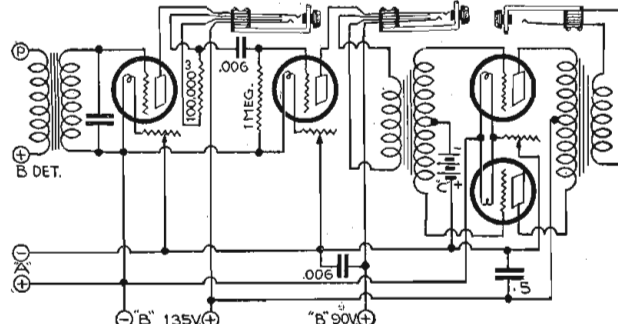


Figure 5

Figure 4 shows an excellent audio frequency amplifying system, which will give exceptional reproduction and is capable of handling a very great volume of energy. This is the best means known of getting pure reproduction without resorting to the use of resistance coupled amplification. The ideal amplifier is naturally one that will give the greatest amount of signal strength compatible with good quality and clearness. The nearest approach to such an amplifier, and one which is the best possible compromise between volume and

clearness, is shown in figure 5. Making use of four tubes, it is a combination of transformer coupling, resistance coupling and push pull amplification, giving a high amplification for the first tube, a little less, but one without distortion for the second tube and the ability to handle volume on the last two tubes.

This amplifier, if built in a separate cabinet with input terminals at one end

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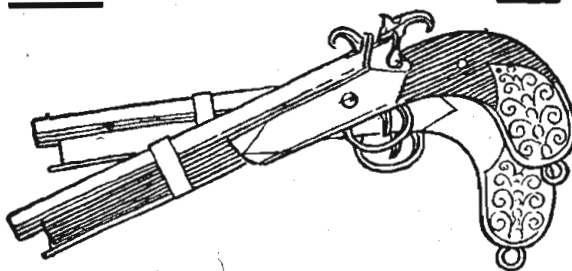
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