

RADIO LORE FOR NOVICE AND EXPERIENCED FAN

Indoor Aerials Solve Problem of Many Landlords' Objections

Crude Workmanship on Average Outdoor Structure Makes It Undesirable.—Loop Antenna Set Satisfactory If Made Correctly

BY J. J. HAGAN

There are landlords—and landlords. Also there are radio sets—and radio sets. Some of the landlords and some of the radio receivers do not get along well together, especially if that radio set happens to require an outside aerial. You know, one can hardly blame the landlords, though. Just take a trip around town and look over the roofs. Did you ever see such a disgraceful mess of wires in your life? It's a lucky thing that the telephone and electric light companies do not employ radio fans to string their wires. If they did we would be without lights or telephone service most of the time.

We venture to state that out of the thousands of radio aerials gracing (?) the roofs of most cities there are not a dozen which are put up in a workmanlike manner. There are probably less than a dozen which have straight poles supporting the wires, and when you get right down to it, can you blame some of the landlords for not permitting radio aerials on the roof?

To those radio fans unfortunate enough to live in apartments where such antennae are not permitted and to those of you who would rather have your whole outfit inside of the apartment, cheer up—there is hope. The answer is a loop antenna set which is half way within the bounds of reason in so far as building and operating costs are concerned. Furthermore, it's not a complicated set and if you have done any radio building at all you should not have any difficulty in making this one. It's just the same thing as any other tuned radio frequency set with one more tube added to make it sufficiently sensitive to operate from the loop.

On this page you will see a schematic wiring diagram from which you should be able to make the set easily, but before you do a single thing, read on and learn the fine points and the little things that you must watch after all, you see, the loop antenna set has no kinks which must be ironed out in order to make it work properly.

Before going into the actual construction of the set we would point out just one thing. That is the location of the set and the loop inside of your abode. The writer once had a loop set inside of a certain big apartment house and it absolutely refused to work despite the fact that we could actually see the transmitting aerials of two of the local broadcasters. Try as we might, the set would not "perk" until it was placed in a corner of the living room where the loop aerial was directly in line with two windows.

That building was made of steel and the rooms were lined with metal lath. The radio set was completely screened and when we did get it working it was because we were receiving through the windows. The loop aerial completely lost its directional powers, even then.

This is put in here just to let you know what you may expect if you happen to live in one of those big steel, tin-roofed buildings. The loop aerial, as you see, is a square in the center of the loop. The first thing that strikes the eye is the queer-looking square in the upper right-hand corner. This is the loop aerial and it is made by building up a cross or "X" of wood, which, when finished, will be 27 inches across each leg. You may wind the wire spirally, if you wish, or better yet, by securing four small pieces of hard rubber or bakelite and making 16 saw cuts in their edges. By securing these strips to the ends of each cross piece to form a square with the wood in the center, you will be able to wind the wire on in almost no time at all. The wire may be almost anything. We used No. 22 double cotton covered, and it worked as well as any other size.

By placing this loop so that it is upright you may mount it on a wooden base. Drill a hole up into the lower part of one of the legs, and after driving a heavy nail up through the baseboard, slip the loop over the nail and the hole that you have just drilled. This will permit you to turn the loop in different directions, because in most cases the loop must be pointing at the broadcasting station in order to pick up the signal. Another and simpler way of accomplishing the same thing is to put a screw eye in the end of one of the legs and another in the ceiling so that the loop may be brought out to its normal position on the lower of the four legs and flexible leads run from here to the set itself.

Of course, the two ends of the wire on the loop may be brought out to its normal position on the lower of the four legs and flexible leads run from here to the set itself.

This loop antenna is tuned by the first condenser, C-1, which is the ordinary 500 microfarad affair usually having 20 plates. From here the signal passes

through the first radio-frequency tube, R-1, and thence to the primary of the first radio-frequency transformer, L-1. The secondary of this is tuned by the first section of the two-gang condenser, C-2 and C-3. The other half of this condenser tunes the second radio-frequency transformer, L-2, from which we go into the detector circuit which is made regenerative by the tickler coil, L-7. The rest of the circuit is the ordinary two-stage audio amplifier. Of course, if you wish you may use resistance coupled amplifiers here, but if you do it will probably be necessary to use one more tube in this end of the circuit.

The whole secret of the set lies in the two coils L-1, L-2 and L-3. These coils must be identical. This means that the two primaries, L-1 and L-2, must be the same and the two secondaries L-2 and L-3 must also be the same. Unless this is done the set will not work properly, if at all.

The reason for this careful construction is due to the fact that the condensers which tune these coils are on a common shaft. In other words, two sets of rotary plates on the same shaft and two sets of stationary plates on the same frame. This is done to do away with the fourth control which would be necessary were we to use separate condensers.

Automatic rheostats are used in the negative leads of each of the filament wires and the grid returns of the first three condensers are wired to the arm of a 400-ohm potentiometer which is placed across the A battery wiring. Ordinary commercially made coils may be used throughout, but for the benefit of those who prefer to "roll their own" it is necessary to give the details of these. The primaries of all three coils, L-1, L-2 and L-3, are composed of eight turns of No. 22 double silk-covered wire. The secondaries are on the same turns, one-quarter of an inch away, and consist of five turns of the same size wire. The diameter of the forms should be five inches and they should be suspended from the backs of the variable condensers by small brass angles. Of course the coil on the left-hand side of the rear view of the set is the regenerative unit and it contains a tickler coil, L-7, which should consist of from 1 to 15 turns of the same size wire. This coil, of course, is arranged on a non-magnetic shaft, the outer end of which is connected to a small knob on the front of the panel. This knob, by the way, holds the same position on its end of the panel that the potentiometer holds at the other end.

The panel used in this set was 24 inches long and seven inches high. A substantial wooden baseboard was also used, which was screwed directly to the lower end of the panel. The wiring used is flexible, stranded copper, run mostly in the most direct line between terminals. All of the leads in R, F, L and A are made as short as possible, and for each tube the wires carrying the higher frequencies were made exactly the same length. This is necessary to make the set tune properly.

The use of a gang condenser, such as we have here, makes it highly important to have the leads of these two units identical. If they are off a little the condensers would, if they were separate units, have different dial readings, but since they are connected together on the same shaft and it is impossible to compensate for the difference in readings, it is absolutely essential to have the component parts the same. If there is a difference of only one or two degrees the set will not give the proper signal strength because you will be unable to tune it to its fullest volume. Of course, one way of getting around this is to use a small vernier condenser at the end of each of the two units, but this might just as well use another full-sized condenser, for it defeats the very purpose of the simplified control.

If you are one of those individuals who are never satisfied with a radio set and you want to add something further to this one you can do away with the loop aerial and use a regulation antenna and ground instead.

This is accomplished through making the antenna distance just the same as the other already described, and connecting the secondary of this coil across the two binding posts where the loop is at present connected. The two primary wires, by the way, are simply connected to the aerial and ground, respectively. Such an arrangement as this may give you slightly better distance, but it will make practically no difference in receiving the local stations.

In operating such a set as this you may at first find that it is unstable. This may be due to the wrong setting of the potentiometer, or you may be using too much regeneration. You will, after a time, find the proper balance for the two controls and for all ordinary work they may remain untouched. Of course, if you are going to skip around a lot

SHORT CIRCUITS



RADIO PROGRAMMES

There are three main tuning dials, and each of these should be screwed to the shaft so that the 100 mark is at the top when all the rotary plates are in mesh with the stationary ones. By doing this carefully you will find that the second and third dials read just about alike for the different stations, but the first dial will be off a little because it tunes the loop and not an inductance. If you are lucky enough to hit just the proper inductance in the loop, this, too, should read the same. However, the chances of having this happen are rather remote. You will find that this set will tune extremely sharp, due to the extra stage of radio-frequency amplification and also to the use of the loop aerial. No neutralizing condensers are necessary with the control as outlined, and once you get the hang of the set you will find that it will give exceptionally fine reproduction without undue difficulty in tuning. Such a set would make a fine portable if dry cell tubes were used and the overall size reduced in proportion.

Battery Readings.
When it is inconvenient to use a hydrometer take a reading of the "A" battery with a low voltage voltmeter. This should read 6.6 volts when full. The battery reads charging when the voltmeter reads as low as 5.1.

Tan Soldering Flux Carefully.
Never let soldering flux get on the terminals of the telephone jack. As soon as this material gets hot it will run in through the fibre insulation and cause leakage at this point.

WJAR begins the new week with broadcasting of the Capitol Theatre Family concert at 7:20 this evening and the Goldman band concert at 9:15. Tomorrow's new feature will be two concerts by the Merrimack Entertainers, a jazz band, and the opera, "Martha," at 10:00 p. m. A safety council talk by Shirley Harrington will be Tuesday's special number at 8:05 p. m. For Wednesday, in addition to regular WJAR entertainers, Ed Parent's dance orchestra will be heard at 8:05 p. m., followed by "The Grand Duchess," a light opera. Another talk by Charles E. Price, secretary-manager of the Automobile Club of Rhode Island, is scheduled for Thursday at 8:20 p. m., and a big Scotch programme will go on the air at 8:25 p. m. Regular artists will be heard Friday and Saturday.

WJAR, opens the week with broadcasting of this morning's service of the Cathedral Church of St. Paul, Boston, at 10:35, and an organ recital at 7:30 p. m. To-morrow will be devoted to regular WJAR artists. Tuesday's specialty will be a popular programme by John Fitzpatrick, organist. At 4:00 p. m. Wednesday, a radio playlet will go on the air at 8:30 p. m. Thursday, Friday and Saturday will be devoted to regular entertainers and dance programmes relayed from noted New England summer resorts.

WJAR will broadcast programmes to-morrow and Friday nights.

WJAR-THE OUTLET COMPANY-485

To-day.

7:30 p. m.—Musical programme by Major Edward Howe and the Capitol Theatre Family.

8:05 p. m.—Studio programme.

8:20 p. m.—Weather report.

8:30 p. m.—Charles E. Price, secretary-manager of the Automobile Club of Rhode Island, will talk on "Auto Living."

8:35 p. m.—All Scotch programmes: "Ladies of the Night" and "Bowen Tree," by Gordon Marquis, baritone; South selections by Jack R. Cullen, band; guitar; "Wells of Weir" and "Home of Mine," by James Pearson, tenor; "Belong to Glasgow" and "She's the Lass for Me," by "Sandy" Miller, Scotch comedian; Mrs. Robert Paveck, pianist; and "The Grand Duchess," light opera.

9:00 p. m.—Cathedral Church, Boston.

10:00 p. m.—Ed Parent and his Braemore dance orchestra.

10:30 p. m.—"The Grand Duchess," light opera.

THURSDAY.

7:30 p. m.—Studio programme.

7:50 p. m.—Weather report.

8:00 p. m.—Charles E. Price, secretary-manager of the Automobile Club of Rhode Island, will talk on "Auto Living."

8:05 p. m.—All Scotch programmes: "Ladies of the Night" and "Bowen Tree," by Gordon Marquis, baritone; South selections by Jack R. Cullen, band; guitar; "Wells of Weir" and "Home of Mine," by James Pearson, tenor; "Belong to Glasgow" and "She's the Lass for Me," by "Sandy" Miller, Scotch comedian; Mrs. Robert Paveck, pianist; and "The Grand Duchess," light opera.

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To-day's Programmes in Brief

For the convenience of radio fans, the following hourly schedule of broadcasting to-day is given in brief form, the complete programme being given under the regular listing of announcements. Figures following stations denote wave length.

The hours are based on daylight saving time.

LOCAL STATIONS	
10:55-Church, WEAN, 367.	7:45-Church, WHN, 361.
11:20-Concert, WJAR, 305.	7:50-Church, WJAR, 315.
11:30-Church, WJAR, 305.	8:00-Concert, WJAR, 315.
11:35-Concert, WJAR, 305.	Vesper, KFI, 468.
11:40-Concert, WJAR, 305.	Concert, WJAR, 315.
11:45-Concert, WJAR, 305.	Concert, WJAR, 315.
11:50-Concert, WJAR, 305.	Concert, WJAR, 315.
11:55-Concert, WJAR, 305.	Concert, WJAR, 315.
12:00-Concert, WJAR, 305.	Concert, WJAR, 315.
12:05-Concert, WJAR, 305.	Concert, WJAR, 315.
12:10-Concert, WJAR, 305.	Concert, WJAR, 315.
12:15-Concert, WJAR, 305.	Concert, WJAR, 315.
12:20-Concert, WJAR, 305.	Concert, WJAR, 315.
12:25-Concert, WJAR, 305.	Concert, WJAR, 315.
12:30-Concert, WJAR, 305.	Concert, WJAR, 315.
12:35-Concert, WJAR, 305.	Concert, WJAR, 315.
12:40-Concert, WJAR, 305.	Concert, WJAR, 315.
12:45-Concert, WJAR, 305.	Concert, WJAR, 315.
12:50-Concert, WJAR, 305.	Concert, WJAR, 315.
12:55-Concert, WJAR, 305.	Concert, WJAR, 315.
1:00-Concert, WJAR, 305.	Concert, WJAR, 315.
1:05-Concert, WJAR, 305.	Concert, WJAR, 315.
1:10-Concert, WJAR, 305.	Concert, WJAR, 315.
1:15-Concert, WJAR, 305.	Concert, WJAR, 315.
1:20-Concert, WJAR, 305.	Concert, WJAR, 315.
1:25-Concert, WJAR, 305.	Concert, WJAR, 315.
1:30-Concert, WJAR, 305.	Concert, WJAR, 315.
1:35-Concert, WJAR, 305.	Concert, WJAR, 315.
1:40-Concert, WJAR, 305.	Concert, WJAR, 315.
1:45-Concert, WJAR, 305.	Concert, WJAR, 315.
1:50-Concert, WJAR, 305.	Concert, WJAR, 315.
1:55-Concert, WJAR, 305.	Concert, WJAR, 315.
2:00-Concert, WJAR, 305.	Concert, WJAR, 315.
2:05-Concert, WJAR, 305.	Concert, WJAR, 315.
2:10-Concert, WJAR, 305.	Concert, WJAR, 315.
2:15-Concert, WJAR, 305.	Concert, WJAR, 315.
2:20-Concert, WJAR, 305.	Concert, WJAR, 315.
2:25-Concert, WJAR, 305.	Concert, WJAR, 315.
2:30-Concert, WJAR, 305.	Concert, WJAR, 315.
2:35-Concert, WJAR, 305.	Concert, WJAR, 315.
2:40-Concert, WJAR, 305.	Concert, WJAR, 315.
2:45-Concert, WJAR, 305.	Concert, WJAR, 315.
2:50-Concert, WJAR, 305.	Concert, WJAR, 315.
2:55-Concert, WJAR, 305.	Concert, WJAR, 315.
3:00-Concert, WJAR, 305.	Concert, WJAR, 315.
3:05-Concert, WJAR, 305.	Concert, WJAR, 315.
3:10-Concert, WJAR, 305.	Concert, WJAR, 315.
3:15-Concert, WJAR, 305.	Concert, WJAR, 315.
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3:35-Concert, WJAR, 305.	Concert, WJAR, 315.
3:40-Concert, WJAR, 305.	Concert, WJAR, 315.
3:45-Concert, WJAR, 305.	Concert, WJAR, 315.
3:50-Concert, WJAR, 305.	Concert, WJAR, 315.
3:55-Concert, WJAR, 305.	Concert, WJAR, 315.
4:00-Concert, WJAR, 305.	Concert, WJAR, 315.
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4:50-Concert, WJAR, 305.	Concert, WJAR, 315.
4:55-Concert, WJAR, 305.	Concert, WJAR, 315.
5:00-Concert, WJAR, 305.	Concert, WJAR, 315.
5:05-Concert, WJAR, 305.	Concert, WJAR, 315.
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