

# Multiple Wave-Lengths to Improve Broadcasting

## By H. WINFIELD SECOR

**I**F you are a radiophone broadcast enthusiast, and particularly if you have been using a loud talker in connection with your radio receiving set, you have no doubt noticed the fact that, contrary to your expectations, a brass band did not give any greater volume of sound from your loud talker apparently, than when a single solo number was played or sung. Furthermore, you have noted the fact, no doubt, that when a number of instruments were played, as well as when several people sang together, the results were not always very satisfactory. One of the principal reasons for this difficulty in radiophone broadcast reception seems, from the writer's observations, to be due to the fact that the single diaphragm of the loud talker cannot properly respond to all of the various vibrations and different notes, which are being sounded simultaneously when a group of people sing or play.

Some time ago one of the leading manufacturers of loud speakers was called upon to install several of these instruments in a large dance pavilion in a California city, and excellent results were obtained by using separate circuits for transmitting and reproducing, telephonically, the music from each instrument in the orchestra. For instance, there was a microphone assigned to the piano, the saxophone, the violin, the trombone, etc., and each of these microphone circuits was connected to its own loud talker placed in a distant part of the dance pavilion,

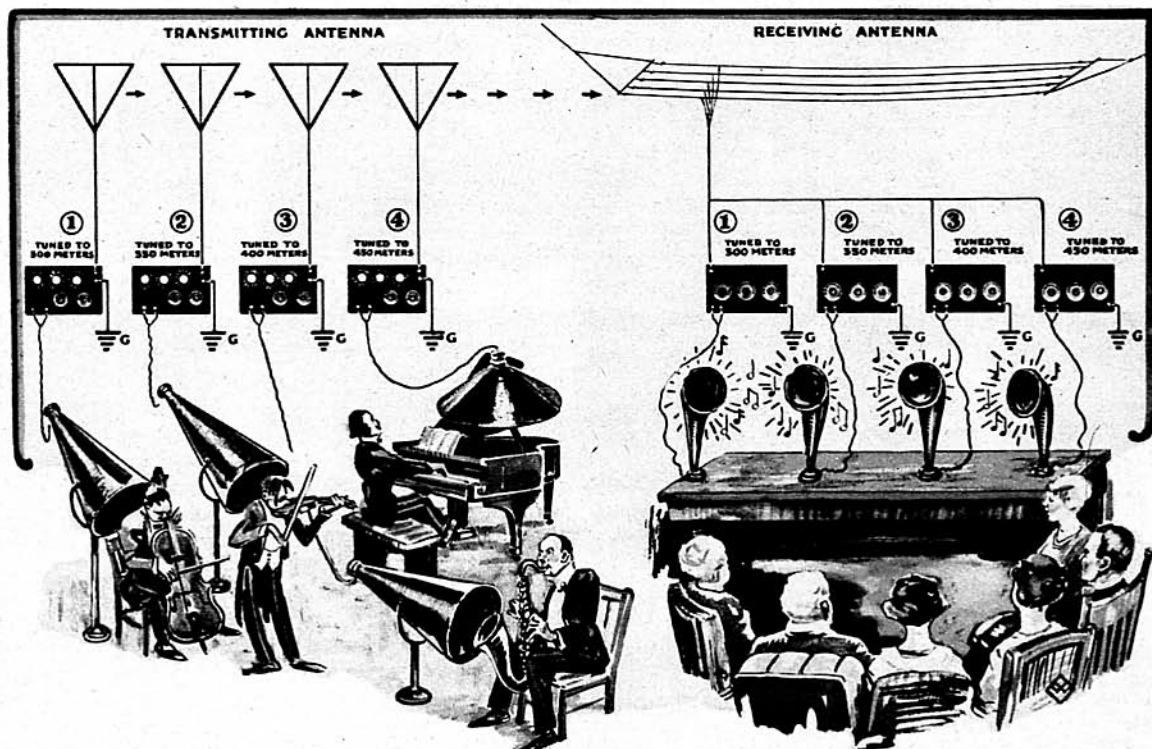
each loud talker therefore reproducing the music from one of the instruments only. It is readily seen from this description that when all the loud talkers were actuated by their respective microphones, a harmonious flow of music ensued.

The diaphragm of a telephone receiver, which forms the basis of practically all loud talkers, is limited to the number and form of vibrations to which it can respond at one time. Of course, it will attempt to give some sort of reproduction of all the sounds impressed upon the microphone connected with it, the same as all phonographs do, but experience shows that the ordinary loud talker does not give the results that one might ex-

pect, when it comes to reproducing band music, to mention but one example.

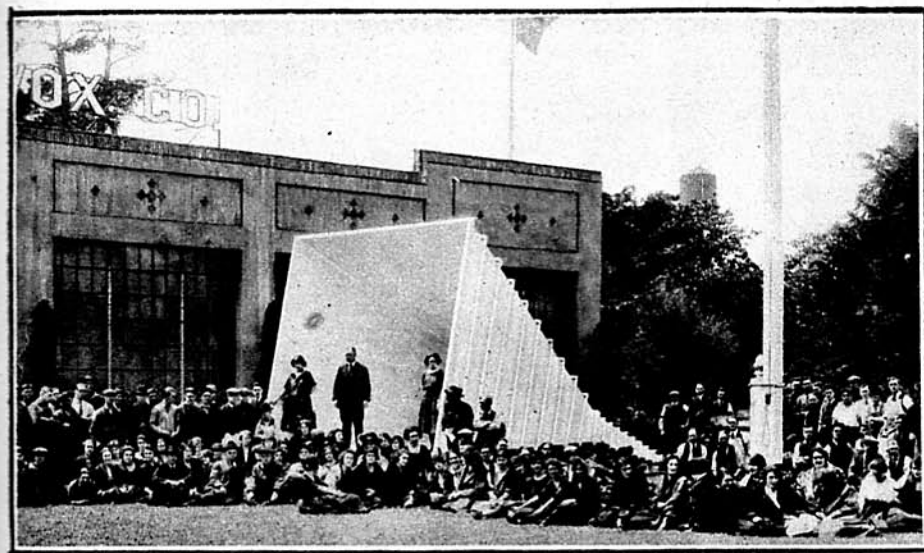
Bearing in mind some of the earlier radio experiments carried out by Dr. Marconi, in which three or more radio messages coming from different stations on different wave-lengths, were picked up on the same antenna and caused to record in dots and dashes on their respective tape registers, each detector being connected with its own tuning inductances and condensers for adjustment to the respective wave-length, such a multiple wave-length transmitting and receiving scheme might well be applied to radiophone broadcasting.

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By the Use of Separate Sets for the Broadcasting of Music Much Clearer Tones Would Be Obtained, As Each Microphone and Loud Speaker Would Reproduce the Music From Only One Instrument; This Method Has Proved Successful On Wire Transmission.

## The World's Largest Radio Horn



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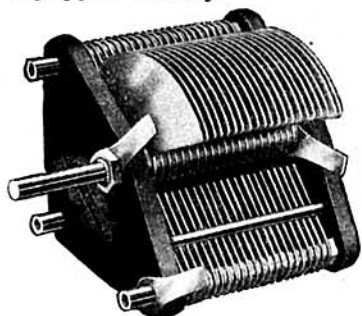
Equipped with the Magnavox radio reproducer and also the Magnavox power amplifier, the broadcasting capacity of this gigantic instrument is sufficient to carry radio music throughout an area of approximately 29 square miles. One thousand feet of clear aeroplane spruce lumber went into its construction, which incidentally presented a number of interesting problems to the engineers by whom it was designed and built.

Of absorbing interest first of all on account of its sheer size and amplifying range (so much greater than any previous horn), this instrument, installed in Idora Park, also appeals to the imagination as being in all probability only the first of its kind. A spectacular "stunt" on the part of an enterprising amusement resort, the basic idea is capable of really impressive development. It is a further indication of the far-reaching

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but only 15' above the nearest roof, so you can see it is very medium indeed. We have three wires spaced 3' apart.

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The regulations out here state that the overall length of the aerial must not be more than 100', so we cannot put up a bigger aerial at present. The length of the flat-top lead-in and ground lead must not be more than 100'.

However, using a "T" aerial only one half of the flat top is counted. This means that an amateur can get 100' of flat top in a "T" aerial with a 30' lead-in and 20' earth lead, and just come within the regulations.

Even on these aerials very good results have been obtained. Many of the amateurs on one tube using a three coil circuit receive up to 6,000 miles and some of them hear Lafayette, Nauen and San Diego.

We look forward to the amateurs in U. S. A. to reach as far as Scotland, as their power is practically unlimited and the aerial can be any size.

Shall be very pleased to hear from the amateurs who are doing great distances using phones, with a copy of their tests between U. S. A. and Scotland.

CHARLES E. FORREST,  
International Electric Company,  
53 Courtenay Place,  
Wellington, New Zealand.

## Multiple Wave Lengths to Improve Broadcasting

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The accompanying diagram shows the idea in a simple way. Experiments would have to be carried out to ascertain whether the several different wave-lengths at the broadcasting station could be radiated successfully from a single antenna, or whether a different aerial should be used for each wave-length radiated. For each instrument, such as a violin, saxophone, piano, etc., or for each singer in a quartet, there would be a collecting horn attached to a microphone in the usual manner. The respective microphones would be connected to individual V. T. transmitting sets, adjusted for different wave-lengths, such as 300 meters for the bass viol; 350 meters for the saxophone; 400 meters for the violin; and 450 meters for the piano.

At the receiving stations, these several different wave-lengths are collected, let us say, on a single antenna and the individual wave-lengths weeded out and directed to their respective loud speakers, through suitably tuned V. T. receiving sets, numbered 1, 2, 3 and 4 in diagram, the four receiving sets in this case being tuned for the four wave-lengths transmitted, viz., 300, 350, 400, 450

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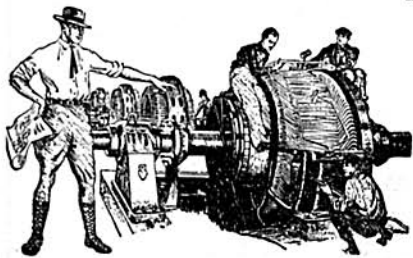
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meters, respectively. In this way each loud talker would have only to reproduce the music from one, or possibly not more than two or three different instruments, so that a much clearer and louder reproduction would result.

This idea is given for what it is worth, and no doubt there are a number of different ways in which this scheme may be carried out. By utilizing special carrier wave combinations and suitably super-imposing the voice on these waves, it will come to pass no doubt, that all of the different tone waves so to speak, can be transmitted from a single antenna. By a suitably worked out compound tuning scheme at the receiving station, all the different tone waves may be weeded out and directed into their respective loud talkers. Once the wave-lengths to be used are decided upon, the tuning of the transmitting and receiving sets can be simplified by gearing or linking the several condensers and inductances together, so as to be operated by a single handle.

### The World's Largest Radio Horn

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influence of radio on the world's work and play which warrants attention.

To the radio expert, however, the most interesting aspect of the situation is the fact that, through the use of its electro-dynamic reproducer, such true tones have been produced as to eliminate "distortion" even when employing this tremendous horn.

### Four Principles for Care of Radio Storage Batteries

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on the cell actually being tested. The plug on this cell should be replaced before the next one is removed. If this is done, there will be no accidental exchange of solution from one cell to another.

When all cells are in good order, the specific gravity of the electrolyte will test about the same (within 20 points) in each of them. Gravity at 1.235 to 1.250 indicates a fully discharged battery, which should not be used without recharging. If, after having a battery fully charged, it soon runs down again there is undoubtedly something wrong with the wiring system.

When the gravity is markedly lower in one cell than the other, especially after successive readings show the difficulties to be increasing, it is probable that the low cell is not in good order. If there is no leak in the jar and if the gravity has dropped 50 to 75 points below that of the other cells, a partial short circuit or broken insulation within the cell is indicated. Either of these may cause serious injury to the battery and should receive the prompt attention of a good battery repair man.

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