

Proceedings  
*of the*  
Radio Club of America



January - 1928

*Volume 5, No. 1*

RADIO CLUB OF AMERICA  
55 West 42nd Street :: New York City

# The Radio Club of America

*Bryant Park Building, Room 819*

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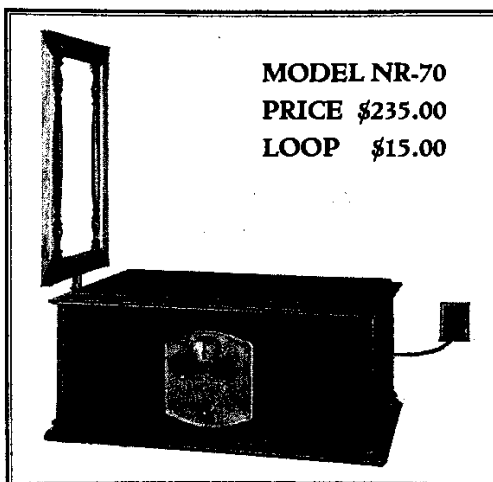
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# PROCEEDINGS

of the

## RADIO CLUB OF AMERICA

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VOL. 5

JANUARY, 1928

NO. 1

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## Experiences of a Radio Engineer

By Robert H. Marriott

*A Paper Delivered before the Radio Club of America on December 21, 1927.*

**S**PEAKING pieces in public has been my lot and duty ever since I was about four years old—whether I wanted to speak them or not. Any time I didn't feel inclined to attend to my duty when I was young, my father would take out his penknife and start for the apple tree by the pump, east of the kitchen, and cut himself a healthy switch. The next cut would take place in the woodhouse northwest of the kitchen, and in the vicinity of my south end. A hasty compromise in the woodhouse would, on the other hand, often save both the switch and southern quarters.

The papa that caused me to compromise myself this time is Louis Gerard Pacent, a director and collector of speakers for The Radio Club of America. Louis caused me to compromise by resorting to no sterner measures than a few compelling telephone calls. He confidentially informed me that the board of directors had been forced to choose me for this meeting because the membership was objecting to so many high-brow papers, and the board decided I was the only radio engineer in the world who couldn't write a high-brow paper.

Louis heaped encouragement on my shoulders by the remark that the paper did not need to be about anything in particular or anything important; in fact, they would prefer that I talk about myself, he said. I have written, therefore, a paper which might almost be called "The Personal and Other Confessions of a Radio Engineer," it being modulated to suit the confessor.

If there had been radio amateurs when I was a kid, I suppose I would have been one myself. As it

was, I had built myself a little eight-by-ten shop in the field back of the garden, had built a turning lathe, had monkeyed with batteries and had tried to build a bigger motor than the one I had bought, by the time I was fourteen.

At the World's Fair in Chicago, at an Exposition in Cincinnati, and at lectures at Lakeside, Ohio, I was very much fascinated by scientific things. In High School I got along at the top of my class in science and mathematics and at the bottom in almost everything else. From that you can see that I was probably the kind of a fan that might have been a radio amateur if I hadn't been born too soon. As it was I got my first radio engineering practice in the academic fashion according to college rules, and jumped from that into radio engineering as a profession.

My first radio experience occurred down on the farm at Richwood, Ohio, when I read an article about Tesla in 1894 or 1895. The article discussed Tesla and talked about telegraphing without wires across the valley between two mountains. I do not recall now whether Tesla said at the time he had already done it or that he expected to do it. He may have used the reputed work of Loomis as a basis for prognostication. At any rate, I got the impression it could be done, but the article did not say how to do it.

A year or two later the publicity about what Marconi was doing came to my attention, and at about the same time publicity about X-rays came out. These two things interested me profoundly. I had another bug too. I had always wanted to know why the illuminated ends of the fireflies I caught were not

**T**HE author of this paper is none other than Robert H. Marriott, whose name is known wherever radio communication history is known. Mr. Marriott was the first President of the Institute of Radio Engineers, and today he is the Chairman of the Meetings and Papers Committee, and has been a Manager of the I. R. E. for many years. He has been a real pioneer since the beginning of radio—far before the days of broadcasting. And he has served the radio art and radio industry in ways too numerous to mention.

hot. So in 1897 I entered the General Science Course at Ohio State University with three scientific things uppermost in my mind, namely, cold light, X-rays, and wireless.

Professor Thomas, the Head of the Physics Department, burned himself with the X-rays, talked discouragingly of cold light, and nearly as discouragingly concerning wireless. Evidently X-rays were too hot, light was a cool unresponsive proposition, and wireless wasn't so hot either, from his point of view. I dropped the cold light then and there and decided on wireless. X-rays remained a side issue with me at different times until 1905.

No other student in my classes at the University had faith in wireless, so I couldn't get anybody else to work with me on the subject as a specialty. I therefore had to use a clock and a tape machine as my partners. The clock pendulum touched mercury at the bottom of its swing, operating the transmitter when I was receiving. The tape machine recorded the received signals once in a while when I was transmitting.

The Professor was a great deal like the clock; he was very precise and ticked out his words in one tone. He seemed to regard nearly all of the boys, except the very quiet studious ones, as human errors that he was tolerating and wasting his time upon. He was painfully scientific and dry and apparently abhorred popular science. Naturally enough, his son now is a very interesting popular science lecturer and makes a tour every once in a while for the Westinghouse Company.

As nearly as I could understand and translate the precise, evenly modulated, slowly flowing sentences of my instructor, he regarded Marconi's work as a repetition of Hertz's work, combined with a lot of hot air. I guess he was right, but the hot air attracted attention and made the Maxwell-Hertz work sound great. You might say that one of the first things I was taught was that Marconi did not invent wireless. About all I recall that Marconi brought out during those days were some little coupling coils wound up in various ways, and which he called "jiggers."

After months of going over the experiments of Hertz, the big induction coil transmitter with the clock operator was set up in the basement laboratory, with an antenna on the roof, and I would wander out to other buildings on the campus with my receiver and batteries in a box, put up an antenna, and try to receive from this crude transmitter.

One time I transported the receiver as far away as the gymnasium, about a quarter of a mile from the transmitter, and took some students there to see it. The gym was built like a castle and I had the receiver on the top of a turret at the base of a flag pole, to which the antenna was attached. Among other things, I tried to demonstrate the effect of raising and lowering the antenna. One of the girls took hold of the rope and I tried to pull her up. The rope broke quite promptly and the University had to send to Cleveland for a sailor to put in another rope. That didn't help me at all with the Professor, even though I didn't tell him why the rope broke. There was no love lost between the girl and myself, however. We celebrated our twenty-fifth wedding anniversary last month. Our youngest is studying physics now.

Although no fellow student would work with me on wireless, I did have a chum by the name of King Thompson who was interested in real estate as a

business and me as a chum. He read an article in a Philadelphia paper which stated that the American Wireless Telephone and Telegraph Company was starting up with headquarters in Philadelphia, and were going to do wonders with wireless. He cut out the article and gave it to me, advising me to write them for a job.

I took his advice and got a job with them in June, 1901. The rest of their engineering force consisted of Harry Shoemaker, Frederick Midgley, and Greenleaf W. Pickard. James Sawyer came in sometimes to make patent drawings and Cornelius D. Ehret left the patent office a little later to handle patents for that company and others. DeForest and Smythe were working on wireless in another group trying to get started, and so was Fessenden. The Marconi folks from England came over once in a while. The next year they started the Marconi Wireless Telegraph Company of America.

Midgley and I built a station at Briele, at the mouth of the Manasquan River in New Jersey. Shoemaker and Pickard built one at Galilee, New Jersey. Shoemaker and Midgley then put an outfit on a boat and Pickard and I, at Galilee and Briele, tried to get in communication with them.

In the Fall of 1901, for three days or so, the American Wireless Telephone and Telegraph Company and the English Marconi Company made some reports, or attempted to make reports, of the positions of the yachts in the race between the *Columbia* and the *Shamrock* off the North Coast of New Jersey. The two companies spent so much time trying to interfere with each other that it is doubtful just how much correct information they really got through.

American radio interference of the jamming type began with the yacht races in 1901. The English-American contest was not only on the water but also in the ether. Sir Thomas Lipton and his fellows were officially declared the losers in the water. In fact, the English had a poor day for we claimed that the Marconi crowd were the losers in the ether too.

Western United States was covered by two sub-companies under one management, with headquarters at Denver. The company was called the Pacific and Continental Wireless Telephone and Telegraph Company. I went as chief engineer to these combined companies in the fall of 1901. Fortunately we had a place in our district where wireless was needed. That place was between Catalina Island and the mainland of California. After spending the winter at Denver, building the apparatus, we went to the Coast in April and established radio communication there in July 1902, and radio communication remained established there for twenty-one years. It was the forerunner of the present transatlantic radio telephone, but it was considerably less secret than the present single side band system and amateurs were able to listen to lots of conversations between movie folks and others, thereby receiving considerable information of the kind that is not intentionally shouted from the house tops. By putting two cables in place of the radio service between Catalina and the mainland, the A. T. and T. Company provided more secrecy in 1923.

For some years thereafter, most of the radio in various parts of the United States was only of the demonstration type, with occasional temporary services. Many of the radio installations on vessels were made free of charge, as long as five years

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later, to try to persuade steamship companies to use radio.

Point to point stations were installed from Wyoming to Texas in 1905 and 1906, only to be torn down in 1907 because they did not pay.

I used my first audion bulbs at one of these stations in Dallas, Texas, in the fall of 1906. Three of them were sent to me from New York. I connected up one according to instructions and listened. Finally by increasing the filament current I got good signals. Then the filament burnt out. I re-read the instructions, checked the circuits, and put in another bulb. By increasing the filament current I brought in better signals and the second filament burned out. I left the other bulb for another day and forgot to try it.

We were using carborundum detectors and electrolytic detectors then, and they gave us fairly satisfactory results. The audion seemed to be an unreliable thing that would be too expensive for batteries and for bulb renewals. The unusual loudness of the signals it produced just before it burned out, was the only thing that made me think the audion might amount to something sometime.

My first experience, as a radio engineer, which brought me into contact with the Radio Club of America, was as U. S. Radio Inspector. That was when your Club's membership consisted of the amateurs of New York. You sang your songs, not on the sidewalks of New York, but you sang them, nevertheless, in all kinds of weather, from the roof tops of New York, all over the town, and all around the town.

I had gone into the U. S. Radio Inspection Service because, as superintendent of construction and maintenance for commercial companies, I had learned first hand what was necessary in ship and shore radio stations for them to comply with the Law. I knew what to do with commercial companies and apparatus. Also, I knew a lot of amateurs quite well.

I believe the reason I got along pretty well with the amateur work was because I always tried to be as tolerant as possible with amateurs. I was more tolerant with amateurs than with the professional companies. I knew the tricks of commercial companies and had quite definite ideas as to what they could and should do.

The amateur was not such a definite problem to my mind. Nearly all professional people connected with radio service were against the amateur. I personally believed that the amateur was very desirable, but I did not know just why and how. He worked at radio without getting paid for it. There was something basically good about that. He was commonly a boy. The boys of today are the men of tomorrow. That always has been a valuable thing to recognize.

There has always been among some radio engineers a tendency to be select and exclusive. The desire seems to be to treat youthful engineers and those who do not belong to the anointed group, as children. That is, the uninvited should stay out, be respectful, and believe in whatever they are told by the self-selected. Such an attitude is not good for radio development. Radio should be democratic.

One of the funniest and most flattering stories I heard about myself and the U. S. Radio Inspection Service was told me by an Irish radio operator. An Irishman can be expected to tell such stories.

He said that several radio operators were chewing the fat in some British Port when one of them told

his experience with radio inspectors. According to this man's embellished story he had been inspected several times. In some European country when he was to be inspected he was notified a day in advance. On inspection day, an officer in uniform arrived accompanied by another man or two in uniform. They were received at the gangplank by the ship's officers and escorted to the Captain's quarters for several drinks and considerable conversation. Later an officer notified the operators to stand at attention for inspection. The inspecting officer then came to the radio room and passed in, with the other officers lined up like side boys. The inspecting officer then asked the radio operator if the radio apparatus was all right. On receiving an affirmative reply he turned and walked out. The inspection was over.

Sometime later this operator came into New York Harbor. His radio set went out of commission on the way. But that didn't worry him for he thought he would probably be able to find out what was the matter with it while he was in port. If he didn't find out and he got notice that he was going to be inspected he would get repairmen from the New York office to fix him up.

His boat tied up to the dock. He watched passengers start to disembark and noticed an insignificant little man pass the Customs Officers, come up the gangplank and head for the deck he was on. He thought it strange that such an unimportant appearing person would be permitted to do that. Suddenly he realized that the shabby little fellow had gone into his radio room. So he went to his radio room and met the person, who informed him that he was an U. S. Radio Inspector, showed him his badge, examined him and his apparatus, and told him what would have to be fixed, then went and told the first officer the same thing. What's more, he (the operator) had to work two days and a night to get his storage batteries in shape and the New York office had to work on the set, and the Captain was on the job to see that they did it. Before they sailed, the same little fellow appeared on the scene and re-examined everything.

After he had recovered from his shock of such an inspection and had gotten away, he said he was able to figure out all but one thing. He could see how an insignificant little fellow could be an effective inspector, with the backing of the United States Government, and he could understand that such an inspector could know more about his apparatus than he did, when he tested it, but there was one thing he couldn't understand. He was sure from the way the inspector had asked him the first question and before he touched anything, that the inspector knew his apparatus was out of working order. How does he do it? When a U. S. Radio Inspector sees a ship coming up the river, can he tell from the looks of the antenna whether or not the set is in working order?

The facts of the story were that the ship had not answered when it had been called for two days, and it did not call anybody. The New York *Herald* station at the Battery kept track of the movements of ships and recorded their calls and their failures to answer. The *Herald* station gave the inspecting service any information that the service wanted. Also the inspectors knew from past experience that a vessel which hadn't been coming to a U. S. port would be almost certain to have poorly kept storage batteries the first time it came in. If the operator

had known these things, the prompt visit he received would have been understood.

Some of the early commercial radio installations were worse atrocities than amateur sets. Some companies used ten-inch induction coils on ships. One spark terminal was connected to the antenna and the other terminal was connected to ground. I was very much against them because they were most liable to fail to work under just the conditions they were supposed to work under, namely, in times of distress. I did everything the law would let me do to put a stop to their use. They were a disgrace to radio, and unreliable from the standpoint of the saving of life.

Working for a principle can bring forth embarrassing experiences. I had at least one embarrassing experience in going after that abominable plain antenna, ten-inch coil combination. It had good results, however, because it put an end to this unreliable equipment.

The Commissioner of Navigation, who was then the head of the Radio Inspection Service, had been to Europe. I went down to the vessel to meet him when he arrived in New York. From appearances, the officers of the ship he arrived on had treated him like a king. Everything was very lovely. Having met the Commissioner, I thought I might as well inspect the radio apparatus of that ship while I was there, and avoid a return trip.

The inspection divulged the fact that the ten-inch coil apparatus would not work. I reported that and told them to fix it. That was not so bad but I came back on sailing day and found it was still out of order. Sailing time came with the equipment still bad. To avoid delay they left dock with me on board. The coil arrangement continued to be unsatisfactory, so they anchored off the Statue of Liberty. The ship was delayed twenty-six hours. They said it cost them thirteen thousand dollars.

You can imagine how the Steamship Company, the radio company, and the Commissioner who had been so nicely treated on that ship, felt about the matter. They did not confide in me on that subject. But there was a resulting conference down in Washington, at which the heads of all the Government radio services were present, and the representatives of the radio company, both for Europe and America. They did not receive my presence with any enthusiasm, but they did pass a resolution to the effect that the days of the ten-inch coil were numbered.

That was probably worth as much, or more, to the public and to radio development as anything I had to do with in the Radio Inspection Service, but the people who knew about it and passed on it were not pleased because they either lost money, were inconvenienced, or were embarrassed by it. And all I got out of it was feeling satisfied that I had done a good job whether other people liked it or not. Success in this country is measured largely by money, position, and favorable mention. Valuable acts of that kind are somewhat typical of the engineer. They do not contribute to his success because they go against the grain of people who are influential, financially or otherwise.

A scientist or engineer, as a rule, is not a success from a financial standpoint. He is nearly always poor. Is it because he is worth less? Is he worth less than a broker, a lawyer, a politician, a banker, a dentist, a cartoonist, or a story writer? Or is it because he doesn't rub the right people in the right way? Some engineers should write their experiences

from the standpoint of showing why they have failed to make money. Such a story might be of benefit to other engineers who are coming along.

In the past and present years I have known quite a few successful, unsuccessful, famous, and obscure people. To illustrate what I mean about this matter of success I will tell you of another experience.

Several years ago a young man studied engineering and hung around with me a good deal of his spare time in an attempt to try to learn more about engineering. I tried to help him in any way I could. One day he called me on the telephone and asked me if I could meet him for lunch because he had something important to say to me. At lunch he brought up the subject by first saying he was going to tell me something I would not like to hear. Then he told me he was going to quit trying to be an engineer. Of course I asked him why, and he told me very briefly.

He said: "First, because I don't believe I could be as good an engineer as you fellows are, and second, because even a good engineer has a small chance to make money. An engineer, or scientific experimenter, is at the place where money is going out. The place to make money is where money is coming in. An engineer may experiment and devise things of great value, but from the standpoint of the people who control the money, he is always spending time and money. These people who control the money are hurt every time they see time and money disappearing. On the other hand, the people who control the money are continuously pleased by the man who gets money out of other people and brings that money into the Company. I am going to quit trying to be an engineer, therefore and am going to solicit the sale of contracts and service that will bring money into the company."

That young fellow did what he said he intended to do and today I presume his income is five or ten times as great as that of any of the engineers whom he then regarded as the best engineers. In fact, some of these engineers are working for him now. He probably very seldom sees them and it is just possible that he might "high-hat" some of them if he did, because several hundred people are under him now, and he is busy and successful.

Many engineers may, however, choose to follow their profession, rather than to be a success financially or politically. Nevertheless it is possible that engineers might still hold to their engineering beliefs and become more prominent than they have been. Coolidge and Hughes apparently don't choose to run for President, which seems to leave a pretty clear field for Hoover, who is an engineer.

If Hoover can be as good in the office of President as he has been in other capacities, he certainly ought to raise the relative standing of engineers in the minds of the public. If radio people ever are going to boom anybody for president, I should think Hoover would be a good one to start with.

#### RECOGNIZING A RADIO ENGINEER

**N**OW that we have considered the question of the engineer from the financial failure standpoint to the presidency, let us pass to another question. That question is, "Does anybody know an engineer when he sees one?"

An experience a week ago tonight caused me to think it might be interesting to tell what people seemed to think I was, when they did not know



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anything about me except my appearance. I have lived or stayed for some time in nearly every state in the Union and in Alaska, and therefore, have come in contact with a variety of people.

Does one mode of living and habit of thinking so stamp him that strangers classify him properly? In my case I think it has broadly so marked me that people classify me as having something to do with a science of some kind. For many years strangers have addressed me as either doctor or professor. I believe most of these, who addressed me as doctor, meant doctor of medicine, because a very small per cent. of the people one meets all around the country thinks of doctors of law, philosophy, or science.

In other words, thinking about scientific things and associating with scientific people apparently brands a person. He has a form of "it"—the science appeal which calls for a title like professor or doctor.

I have been called by these titles as a rule, but, as is the case with all rules, there have been exceptions. In Alaska, a professional deep sea fisherman took me for another professional fisherman and wanted information about the fish and weather. On a trans-continental train, the porter thought I was a Federal secret service man investigating the conduct of the pullman service relative to the Mann Act, the dry law, or something of the kind. I was amazed at the service I got and did not find out why until we were near the end of our run. If one casually investigates the mechanism of a train, its automatic lighting arrangements, etc., a train crew with a guilty conscience may jump to the wrong conclusion.

The experience of a week ago tonight is what got me on this subject. It shows that a radio engineer may be classified away out of his class. I had this experience not far from where I live but where I am not known. I live in Brooklyn. Of course you think of Brooklyn as being largely Jewish. Where I live, however, it is considerably Irish. Naturally there is a Catholic center nearby where there are a church and other establishments that go with a Catholic center. That is the environment, and I, a radio engineer, who is neither Jewish, Irish, nor Catholic, walked into a cigar store and asked for a half a dozen cigars of a certain brand. "We have only four of these left, I am sorry, *Father*," was the clerk's reply.

In appearance I average up as a Professor, or Doctor, but evidently I range from a deep sea fisherman to a Catholic priest. I do not know just how much of that is due to my profession, and how much is due to the fact that I occasionally eat fish on Fridays!

One shouldn't skate about on this personal experience stuff in radio without mentioning broadcasting, especially if we were around on the natal day of broadcasting. I was around then, I guess. I say I "guess" because different people have set the date of the birth of broadcasting at different times. Some say that this important event occurred in Frank Conrad's barn in 1920. Others keep dating the event back. They may get it back into a more famous barn in Jerusalem. Anyhow there are a lot of descendants of folks from Jerusalem in the business now. The trouble with the date lies in the fact that a lot of people tried to build wireless telephones

and in doing so they may have broadcast at quite an early date.

Regardless of whether or not broadcasting was acceptably born in the zero year or in 1920, in the stable of an ass or a gas buggy, broadcasting went around the world in 1907 when "Teddy" Roosevelt sent the United States Navy around the world to show some cocky nations that Uncle Sam could do big things if necessary.

Doc DeForest sold the Navy some little arc radio telephones and the Navy boys did the rest. The gobs, electricians, and C.P.O.'s attached phonographs to those radio phones for the entertainment, amazement, and edification of such radio folks as might be listening. The "Star Spangled Banner" stirred up the ether from New York to Hong Kong. If the gobs, classified electricians, and C.P.O.'s ran true to form they probably played, "In the Evening, by the Moonlight, You Can Hear Those Darkies Singing," when they were off African shores, and "Chop Sticks" for the Chinese. "Alexander's Ragtime Band" probably prepared the ether for its present jazzy existence.

Incidentally, stock salesmen were present at some ports to sell DeForest stock on the strength of the free entertainment. Candy, vacuum cleaners, ginger ale, stocks and what not, are sold that way now.

Fessenden used the high-frequency dynamos for telephoning from Brant Rock. However, I never heard music or anything from these that seemed to be entertaining or for everybody to listen to.

Dr. DeForest himself ran a New York broadcasting station in 1908. He played a quite good variety of phonograph records. I broadcast also in 1908 and 1909 from Manhattan Beach, using arcs. I played three records that I remember, "Yankee Doodle," "Dixie," and the "Merry Widow Waltz." The "Merry Widow Waltz" was the popular tune of 1908. Doc DeForest played that tune also. Since we cannot agree as to who was the father of broadcasting, possibly we can agree on the mother—"The Merry Widow."

About that time, 1908, the Cahil Telharmonium scheme was tried for broadcasting music to subscribers over wire lines. The Cahil Telharmonium consisted of a series of dynamos giving the frequencies of the musical scale, being operated by keys. It was located, as I recall, at about 40th Street and Broadway, under where the Studio of WOR is now.

The Telharmonium did not take, probably because the dynamo made music hasn't sufficient human variations, because they did not know how to load wire lines, because wire lines were hard to get, or perhaps because the audience had to pay for what they got. At any rate, the fact that it didn't take, put a doubt in our minds as to whether radio broadcasting could be expected to become popular. Nevertheless radio broadcasting continued until our going into the War, in 1917, closed down such radio stations.

The broadcasts from a hotel in San Francisco, I think it was the St. Francis Hotel, were quite good during the World's Fair in 1915. As I recall it, some girl came in and sang over that station when I was visiting it. Also, as I recall it, DeForest broadcast Caruso from the Metropolitan Opera House during a regular performance in 1909.

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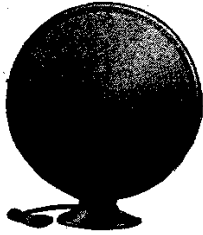
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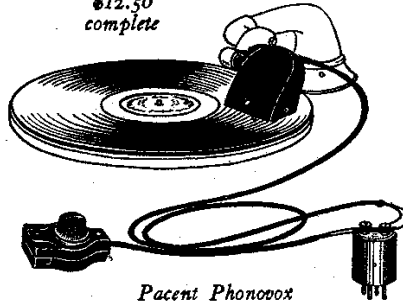
New York City

17 in.  
Diameter



Pacent Balanced Cone \$22.50

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complete



Pacent Phonovox  
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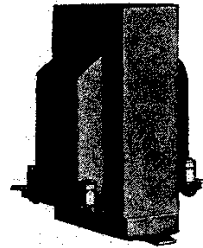
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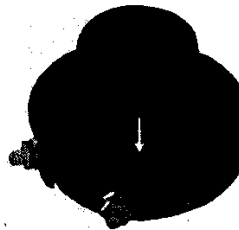
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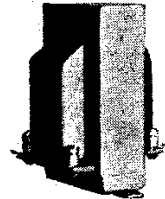
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