

THE HORN SPEAKER

THE NEWSPAPER FOR
THE HOBBYIST OF VINTAGE
ELECTRONICS AND SOUND



Portrait of Jenkins during his active period.

C. Francis Jenkins - Television Adventurer

By **GEORGE H. CLARK**
Radio Historian

in 1876, the idea of voice-over-wires was followed up by a flood of ideas for sight-over-wires. Strangely enough, these were in general very similar to some of the earlier television principles that followed later. Jenkins was an avid reader of books and magazines of a technical nature, even as a lad, and perhaps some of these primitive plans were noted by him and stored away in his mind.

CHARLES FRANCIS JENKINS (1867-1934) of Washington, D. C., was one of radio's most colorful personages, and in his chosen realm of "seeing via the ether" America's best known, most loved pioneer. He was indefatigable in his efforts to create a new art and novel means of serving it, and his personal interest in those with whom he worked, whether in the laboratory or via the web of wireless, was so vital that he made friends everywhere, from the amateurs who listened and looked in to the higher officers of Washington's officialdom.

When Bell brought out the telephone

He came to Washington as a Civil Service employee, and was appointed clerk to the head of the U. S. Life Saving Service, now the U. S. Coast Guard. Passing over the "Government slave" phase of his life, his entry into the world of engineering and of invention was by way of the motion picture field. In 1895 he created and built a moving picture machine, and exhibited it that same year before the Franklin Institute. They thought so highly of it that three years later he was awarded the Elliott Cresson Gold Medal of the Institute, the citation terming this "Phantoscope" "the first successful form of projecting moving pictures from a narrow strip of

film containing successive phases of motion." The original device is now in the National Museum, Washington. His interest in the flickering images was so great that he founded the Society of Motion Picture Engineers in 1916 and was its first president. The Society is now international in scope.

Yet even while he was polishing up his projector for its display in Philadelphia, its use in wireless communication was already in his mind. In 1894 he wrote an article for the July 25th issue of *Electrical Engineer* on the subject of transmitting pictures by wire. The later transfer to the field of radio was inevitable, by the law of genetic descent.

In 1921 he set up a small research laboratory in Washington, surrounded himself by a picked force of young and extremely enthusiastic helpers, and plunged with his characteristic dynamic energy into the investigation and practical construction of transmitting and receiving apparatus.

At that time, Nipkow's disc scanner was universally used for picking out one element of a picture at a time at the sending end and for synchronous reconversion at the receiving end. That device Jenkins adopted. His first task was to teach himself the simple mysteries of scanning, and then the more difficult techniques of making a record. But his mind was far ahead of this work, and even in those elementary days he predicted home movies by radio, prophesying that an "entire opera may some day be shown in the house without hindrance of muddy roads." (Apparently he did not believe that the art of road-building would go ahead as fast as radio and television!)

He then began specific invention, his first venture being the transmission of still pictures by wireless and their reproduction in recognizable form on paper or other medium at a distant point. This, of course, was facsimile radio, or photoradio. His first demonstration on December 12, 1922, was before officials of the U. S. Navy, including Admirals S. S. Robison and H. J. Ziegemeier, Captain J. T. Tompkins, Commander S. C. Hooper, and Lieut. Commanders E. H. Loftin and H. P. LeClair. A report of this demonstration was printed in the *Washington Star* of January 14, 1923.

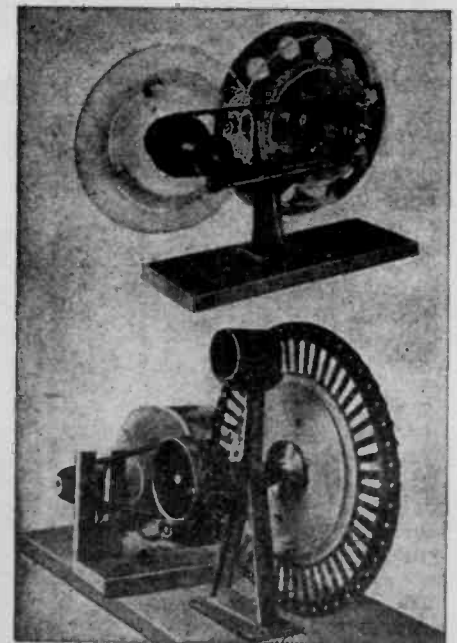
By 1924 Jenkins had greatly improved his technique, particularly by means of his prismatic ring scanner, which, unlike the scanning disc, provided a receiver picture without lines or dots appearing in it, i.e., of photographic



Movie film used in Jenkins' broadcasts.

value. On June 15, 1924, Jenkins made his first 100-line radio photograph, one of the first subjects being a photograph of President Coolidge.

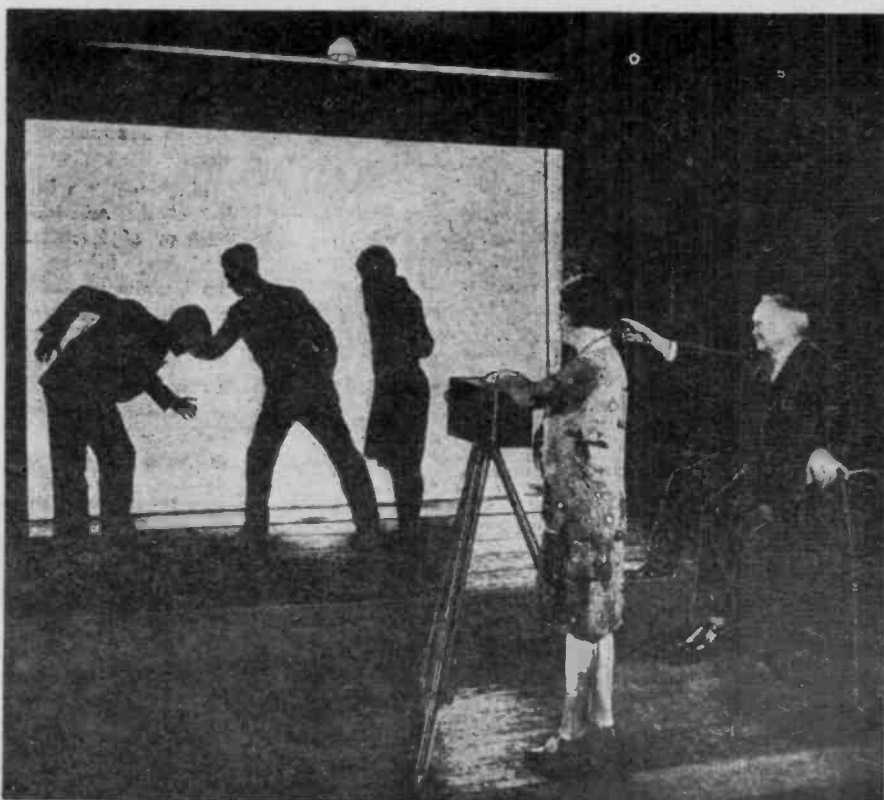
1924 was a telephoto year, for not only was the work described above going on, but the A. T. & T. Co. had stepped into the picture, sending electrical pictures via wire from Cleveland to New York on May 20.



The upper scanner employs the prismatic ring.

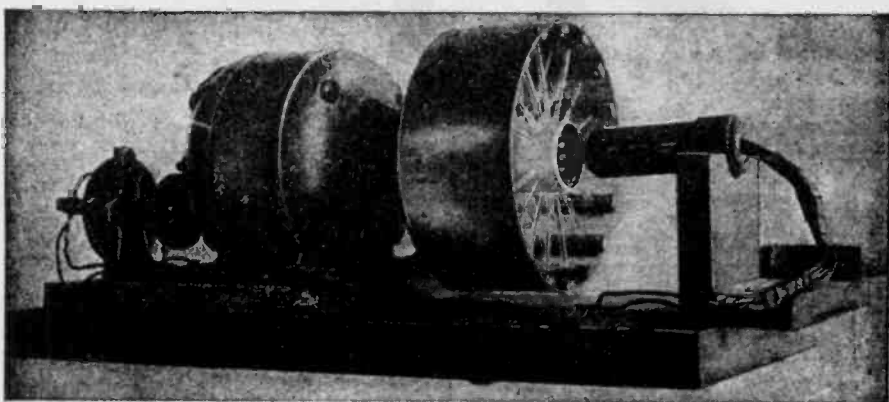
Radio movies at last!

In the following year, Jenkins graduated to radio-movies, even if they were only silhouettes. His first laboratory demonstration of *radio-vision*, a term which he had coined for "the transfer of pictures via the ether," had been on June 14, 1923. Now, in 1925, he was ready to proceed on a broader scale. On March 31, movies by radio were sent from a standard moving picture machine to a small screen on a distant radio receiver. This was a room-to-room experiment; but early in the week of June 3, 1925, he decided that a public demonstration was in order. The transmitting on this occasion was done by courtesy of the U. S. Navy from its Naval Laboratory station NOF, at Anacostia, with the receiver in the Jenkins Laboratories.



Underwood & Underwood, Washington, D. C.

Jenkins invented a new method of photographing silhouettes for early television broadcasts.



The Jenkins-de Forest drum scanner was the most highly refined television receiver to use mechanical scanning principles. It had four spirals of holes and a multiple neon lamp, light from which was "piped" to the holes in the drum through quartz rods to avoid loss.

does not appear in the records of the day, the fine Italian hand of Captain Hooper (now Rear Admiral, U.S.N., Ret.) functioned invisibly in all these tests, for it was he, as the Navy's chief protagonist of matters radio, who organized and approved this test.

What did they see? Not much. A small rotating fan, imitating a Dutch windmill, started, stopped, reversed, as air was blown on it from an unseen source. Finally, a chief petty officer at NOF, by direction of Admiral Robison, stood before the television transmitter and wigwagged a message to his superiors standing before the radiovisor in the Jenkins' laboratory. (Captain Hooper, at least, was able to read the message!) Said Mr. Jenkins of this demonstration, "Congratulations were in order, but they seemed to be given in a rather awed manner, as the unfathomable possibilities of this new extension of human vision came to be more and more realized."

Mr. Jenkins further commented, "This first public demonstration of June, 1925, was duly heralded in the

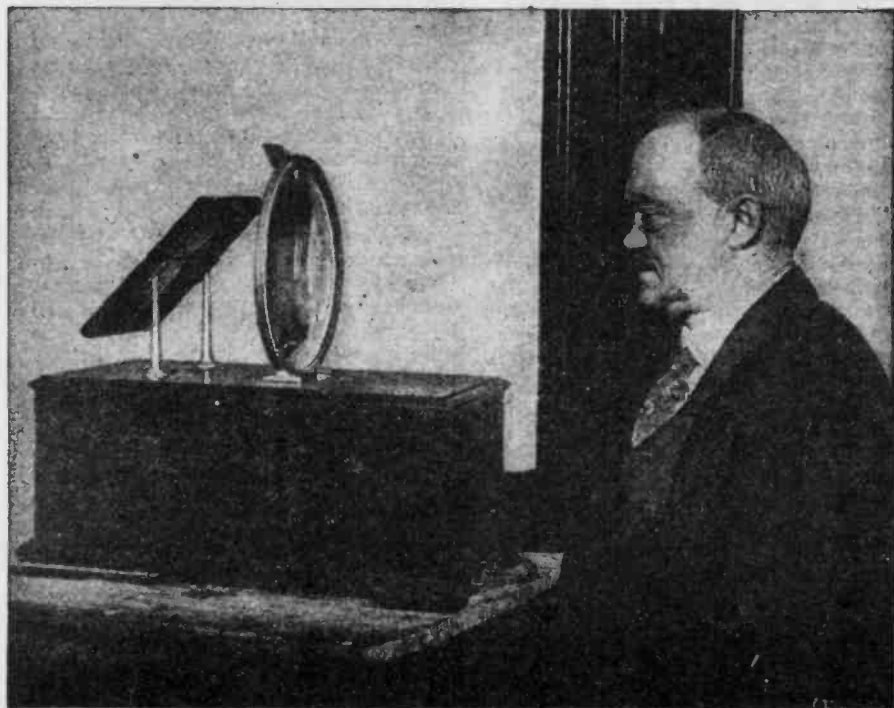
press. But there was no spontaneous response from the public until the A. T. & T. sent pictures of living persons from Washington to New York over their wires. No wires were available to me, so I have used wireless." (As if he hadn't intended to use wireless from the very beginning!)

An amateur scans amateurs

As yet, Jenkins had made no effort to interest the public, or at least the amateurs (who were the radio public of that day), in "home reception." That was probably because there was no appreciation of the possible monetary benefit that might ensue; sales of sets to the Navy had a much more immediate enticement.

But Jenkins was a youngster at heart, and still younger youngsters worked under him, so in time he decided to install a broadcast transmitter for radio-movies (plus announcements) on the amateur band. Station 3XK (later W3XK) was approved by the FRC, and four channels were assigned—to over-

(Continued on following page)



The drum receiver was considered at the time to be a great advance in the art of television.

Present were George M. Burgess, director of the Bureau of Standards; Secretary of the Navy Curtis D. Wilbur; Admiral S. S. Robison; Captain S. C. Hooper, U.S.N.; Judge S. B. Davis, Department of Commerce; and W. D. Terrill, Radio Division, Department of Commerce. Incidentally, although it came skip distance on the short waves used. The first Jenkins radio movie, or radio silhouette, was broadcast on July 2, 1928. During the "talk" part, amateurs were asked to write and give their opinion of the broadcast and tell how it was received, and those who "heard" only were urged to equip their short-wave code receivers with Jenkins picture attachments (discs, motor, light, etc.). Many of them did so, but it was rather difficult for them to lay out, and construct their own spiral discs, although Jenkins gave them full instructions both via broadcasts and by mail on request. So after a short time he manufactured an inexpensive picture attachment and sold it at less than cost. This consisted of a neon lamp, disc, and synchronizer, to be mounted on a synchronous motor.

At first, and for a long time, only silhouettes were broadcast. These seemed perfectly acceptable to the amateurs, most of whom were "kids" either actually or at heart. To produce these silhouettes, Jenkins set up a studio of his own, unique in the movie art, where silhouette movie films could be made as cheaply as ordinary movie films. The stars were recruited from his laboratory staff, except those parts taken by children. Among the latter was little Jane Marie, who came to be known all over the continent as "the little girl bouncing the ball." The studio director was Miss Florence Anthony, (later married to the late George Clark, then a prominent business man of Washington).

Another silhouette well received by the "lookers-in" was "The Old Dutch Girl" of the cleanser ad. A large picture of the Dutch Cleanser can was also televised, showing an early appreciation of commercials. "Possibly," wrote Jenkins in a memo, "we can put in silhouette the little fat boys of Campbell's Soup." Other silhouettes were "The Washwoman," "The Crook," the little girl skipping a rope and then putting it away and turning somersaults, another little girl, Miss Constance, who must have been very clean for every night she washed her doll's clothes and hung them on a line to dry "in a drying breeze," as Jenkins termed it. Then, last but by no means least, was Jacqueline, who did athletic dances with Master Fremont. (I wonder who's tripping her now?)

"Our audience," said Jenkins later, "in those primitive days of 1928 was between 18,000 and 20,000." Letters ranging from Malden, Mass., ("got your picture through the entire transmission despite local severe lightning") to Cedar Rapids, Ia. ("have received every one of your broadcasts"), and even further, south and west, told the story of Jenkins and his unpaid amateur laboratorians. These young home-scientists cared most for the technical pleasure of looking and recognizing, just as later in voice-broadcast days they cared only to receive and

log the voice reception, however inane the content. (QST, please note!)

All these transmissions of line pictures were on the amateur wave of 46 meters. "Silhouettes only were sent," said Jenkins, "so that the picture frequency band could be kept within the legal limit, 10 kc. Later, a band 100 kc

BASIC 10" TELEVISION KIT



1. Sound IF Transformers (2)
2. Schematic diagram
3. 1st PIX IF
4. 2nd PIX IF
5. Cathode Trap
6. Discriminator Transformer
7. 3rd and 4th PIX IF
8. Video Series Peaking Coil
9. Video Shunt Peaking Coil
10. Video Series Peaking Coils (2)
11. Video Shunt Peaking Coils (2)
12. Filament Chokes (5)
13. Power Transformer
14. 13 Channel "Front End"
15. Deflection Yoke
16. Width Control
17. Horizontal Linearity Control
18. Yoke Mounting Hood
19. Focus Coil
20. Iron Trap Magnet
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RADIO-CRAFT for JANUARY, 1948

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wide—4,900 to 5,000 kc—was assigned to us by the FCC so that we could broadcast half-tone movies."

Crude though this early television was, it made its impression as a possible growing art. For example, the *New York Tribune* of June 16, 1925, viewed with alarm as follows:

Before looking any further aid to Jenkins, the Government should consider the effect on posterity. It means stagnation in transportation industries when it becomes unnecessary to go anywhere to see anything. In fact, it is in a way a scientific accomplishment of the notion of Mahomet that the mountain should come to him . . .

Opinions differed, as note this quote from *The Grid* de Forest house organ, 1929:

The success of the Jenkins Washington station for television attracted the attention of financiers, and a financier of New York and Palm Beach undertook the merchandising, under the corporate title of the "Jenkins Television Corporation" of the devices developed by the Jenkins Laboratories.

The new control was in the hands of the de Forest Company, of which the Jenkins Television Corporation (of New Jersey) was a subsidiary. On September 27, 1929, the de Forest directors had authorized the purchase of the television company's stock, at the rate of 1 share de Forest common for 13 1/2 shares of Jenkins. Mr. Jenkins retained his control of the Jenkins Laboratories in Washington, and was vice-president till 1930, when he resigned.

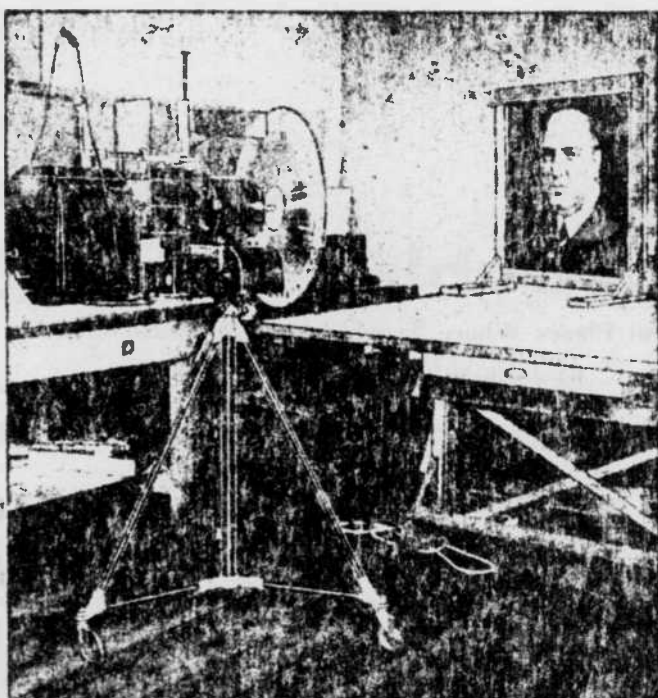
The resignation was partly due to his poor health at the time, partly because he was not "in the saddle" any more, partly because those in the saddle did not cooperate with him and felt they were possessors of a white elephant.

Drum replaces scanner

Before describing the career of the new company in New Jersey, let us consider some of the major developments made by Mr. Jenkins while he was still his own boss. Chief of these are the drum receiver, the plate transmitter and receiver, and the prismatic ring.

The drum receiver was a refinement of the disc scanner, and removed many defects inherent in the latter. In the place of a huge rotating disc with helical holes, he substituted a drum, 6 inches in diameter, the circumferential band of which was pierced with 4 rows of holes, each row being arranged helically. All in all, there were 48 scanning apertures. Inside the drum was a neon light system, not with 1 glow-plate, but with 4 arranged end to end and connected to a commutator so that each plate or "target" was lighted in unison with the rotation of one row of holes on the drum. This complicated structure made it possible to have each target much more brightly illuminated—since lighted only for a short time—than if a single target were lighted continuously.

To conserve the light—which was placed some distance from the periphery of the drum, and not directly adjacent to the rotating element as in the case of the disc—quartz rods acted as "pipes" to carry the light directly outward without scattering. A drum 7 inches in diameter with 6 helical turns gave a 3-inch picture, twice the area of any picture available with a 36-inch disc, and much brighter. "The drum receiver with quartz rods," said Jenkins in the



Jenkins' improved lens-type Nipkow scanner, set up to scan photo of W. T. Barkley, who was then vice-president of the de Forest Radio Co.

Journal of the Society of Motion Picture Engineers in 1930, "is the best television receiver known. It makes bigger and brighter pictures with simpler mechanism and less amplification than any other form. How long it will remain the best form of receiver no one knows, for thousands of engineers, my own included, are feverishly at work on the problem." Those were prophetic words! "His own engineers" did not succeed, nor did the much better trained de Forest engineers, in making a receiver that would be acceptable in commercial television. It remained for the electron to solve the problem, much as perhaps in the near future the atom may dissolve it!

There is this to be said: that the drum receiver was a product of elegance and—within its limitations—of efficiency. That it was not commercially practical can be ascribed partly to the fact that its inventor was not a particularly commercial-minded person.

Beginning of the end

One of the engineers working "feverishly" on the problem was C. E. Huffman, of the de Forest television subsidiary. In July, 1929, he recommended that the drum type of scanner be dropped. The drum receiver, he said, caused the neon tube to burn out in a few hours, due to its being run at a very high intensity to compensate for the 60% loss of light in transmission through the quartz tubes. The commutator also introduced disturbances which had to be filtered out of the receiving set, and was also subject to delicate timing adjustments.

At about the same time, a prominent publicity engineer similarly attacked the work of the Jenkins organization as a whole: "I am perturbed at the progress made by others in the television field compared with that of the Jenkins organization: A year ago, at Lexington, Mass., I saw better pictures than Jenkins shows today . . . The RCA 60-line pictures are very good, better in detail than the Jenkins pictures . . . All others are showing half-tones while we play around with silhouettes . . . The work of Bell Labs. is far ahead of anything

we can dream of today . . . The Jenkins prizefight film is years behind what others are showing; it is so poor that I shouldn't care to invite newspaper men to see it . . . It is only from true friends that you can learn the truth, so pardon my frank criticism . . ."

In 1930 shortly after this frank denunciation, Jenkins was asked to design a new receiver. He submitted the old drum type with quartz rods, which would not be acceptable to the radio public. His career as an inventor, or rather as an up-to-date designer, was ended, and his frenzied efforts to "beat the field" affected his heart. In August, 1931, it was reported that he was seriously ill, and that his life was despaired of. Three years later, after a lingering illness, he passed away.

The prismatic ring

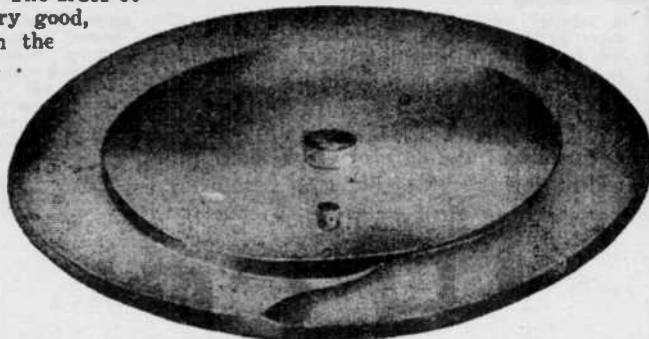
One important element in Jenkins' early apparatus deserves full description here, since no clear explanation has been heretofore published of its nature and the method of its functioning; that is, the prismatic disc or ring.

This consisted of a glass disc (or ring) of selected mirror plate, ground along its outer circumference in a graduated way. From one end to a point half-way round it had its base outward; from this half-way point around to the other end it had its base inward. The warp from one end to the other was gradual. A beam of light passing through this device, when it was rotating, was caused to oscillate, having its hinged action fulcrumed in the plane of rotation of the prism ring. The oscillation was always in the plane of the diameter of the disc from the point where the light passed through the prismatic section.

In effect, the prismatic ring was comparable to a solid glass prism which changes the angle between its sides, "giving to a beam of light passing through a hinged or oscillating action on one side of the prism while maintaining a fixed axis of the beam on the other side of the prism," to quote the inventor directly.

A beam of light passing through a prism is bent toward its base. By mounting 2 disc prismatic rings so that their axes intersect at right angles, the beam can be bent both up and down, and left and right. Nearest the photograph to be scanned is the ring which bends the beam vertically, the other bends it horizontally. The second prism makes 100 revolutions to one of the first.

"For transmitting radio-pictures," said Jenkins, in his book entitled *Vision by Radio*, "we slice up the picture (figuratively) into slices .01 inch wide, by sweeping the picture across the light-sensitive cell with these rotating prismatic rings. With each downward sweep the picture is moved .01 inch to the right, until the whole picture has crossed the cell . . . The cell converts the light strengths into corresponding electrical values . . . In receiving, with the rotating prismatic rings we draw lines with a point of light across a photographic plate, varying the density as this is done by reason of the varying strength of the incoming signal.



"For sending radio-photographs the picture is projected with a magic lantern through 4 overlapping prismatic rings, 2 of which in rotation sweep the picture vertically across the light-sensitive cell, at the same time that the image is being moved laterally by the other pair of prisms. The light cell in its housing changes the different light values of the picture into electrical values. A rotating perforated disc between lens and cell changes the direct current into interrupted direct current, which is then sent through the amplifying transformer."

The reference to "4 overlapping rings" means that for horizontal as well as vertical prism scanning each disc really consisted of 2 placed side by side, overlapping, for optical correction. In the first prismatic rings there had been a slight error, which was corrected by Jenkins by using 2 rings, (one with a plus error and one with a minus error) and cementing the 2 rings together.

The prismatic rings were not intended for radio movies at first, but for a high-speed continuous camera (as opposed to the ordinary intermittently moved film), and were so described by Jenkins at the Montreal meeting of the SMPE in May, 1920.

The prismatic ring device was really a deflection apparatus, or, in other words, a scanner. It took the place of the scanning disc but was continuous in operation rather than intermittent. Jenkins was very proud of this device, because it emphasized elegance in the solution of scanning. Simply speaking, he used an "interposed variable prism" instead of a helical scanning disc. It was a very complete and technically elegant device even though complicated and expensive.

Jenkins the man

The indomitable will and faith which C. Francis Jenkins always exhibited are clearly evidenced by his oft-expressed statement, "If a thing is very difficult, it is as good as accomplished; if it is impossible it will take a little time."

The same idea is shown in his treatment of two brilliant scientists whom he obtained from one of the great laboratories of the country. "They did not last long with us," said Jenkins later, "because they spent too much time proving why it wouldn't work instead of figuring how to do it."

He wanted his assistants to carry out his ideas implicitly, even when they were impractical or even impossible. He surrounded himself in his Washington laboratory with young men and women, "because," he said, "if Jenkins tells them it can be done, they believe it." This had much to do with his final failure, for a few trained engineers in his employ might well have been able to carry his plans from an amateur to a practical status.

However, he gave full credit to these idolizing assistants. After he had succeeded in broadcasting radio movies in 1929, he stated in his dedication of his book *Radio Movies and Television*, published in that same year:

"This thing is done, the long pull is ended. We are broadcasting radio-movie entertainment to thousands, and the credit, in no small measure, is due to the clever and charming young folks who have worked with me—Sybil L. Almand, Florence M. Anthony, Vera T. Hunter, John N. Ogle, Stuart Jenks, Paul Thomsen and Elwood Russey."

He was a man of great vision, with the courage of his convictions, of indomitable will and boundless energy. He loved his fellow men, and was in turn respected by all who knew him and loved by those who had the opportunity of being associated with him. But he had great defects: he was an amateur first and last, and to him inventions were playthings; he would not have others

with him who might translate his devices into more practical form, but insisted that they be made by his "adoring assistants" exactly as he directed. Burning with ambition, he admitted no thought of fault or failure, and when he had reached the high point of the old scanning technique, he could not go beyond. Others did.

During his life span, he built the prototype of the moving picture projector now in every movie theater; he invented the spiral-wound all-pasteboard container still so universally used; and as his contributions to radio and television, the foregoing pages will suffice. He was a member of the Franklin Institute, the American Association for the Advancement of Science, the National Aeronautic Association, and was founder and first president of the Society of Motion Picture Engineers.

Pasted in his Washington laboratory was the motto:

"They said it couldn't be done, but he, poor fool, didn't know it and went ahead and did it!"

which is another form of the common expression:

"People saying it can't be done are constantly being interrupted by people doing it."

And, as Zworykin might have said: ". . . by people doing it better!"

The foregoing abstract has been obtained from Mr. Jenkins' three published books—[Vision by Radio (1928), Radio Movies and Television (1929), The Boyhood of an Inventor (1931)]; from Proceedings of the Society of Motion Picture Engineers; and from numerous other publications; but chiefly from data copied by the author from Mr. Jenkins' scrapbooks, by permission of the late Mrs. Jenkins, and through the kind intermediation of Miss Florence Anthony, former assistant to Mr. Jenkins and later companion to his wife. Many of the photographs accompanying this article were likewise obtained through the courtesy of Mrs. Jenkins.

RADIO-CRAFT for
JANUARY, 1948

Romance by Radio

AFTER reading the following item that came from Canada, the Editor understood why the contributor preferred to remain anonymous:

About a year ago a local station was giving concerts by radio. One evening, after a couple of selections (one of which was a solo by a young woman), the operator asked for some one who was listening in to give a report on the articulation. I called him up by phone and did so, after which I asked permission to speak to the young artist. My request was granted. She was a very nice young woman, and I was soon chatting with her with animation. I made her promise to sing for me by radio. —But I had overlooked possible consequences.

After one or two selections the operator came to the radiophone and called me several times; he announced that Miss Blank would like to speak to me. She came to the transmitter and said twice:

"Hello 3XX; I am going to sing a love song for you."

There were half a dozen people in my station at the time, and I sought desperately to turn out the filaments, but they would not let me. I was too confused to catch the song, but my visitors were having a rare time at my expense. As soon as the last words of the song died away several spark stations opened up with "Hi Hi" as a sort of grand finale. After the concert several stations called me and asked embarrassing questions.

The next morning when I went to the front door to pick up the morning paper, I found that some wag had written on the front of the house, in large characters, "3XX; I love you." The paper had an interesting account of the concert of the previous evening, and I read the cheering news that the program had been heard about 150 miles and by several thousand persons.

That cured me. The next time I do any flirting it will not be done by radio.

ANONYMOUS

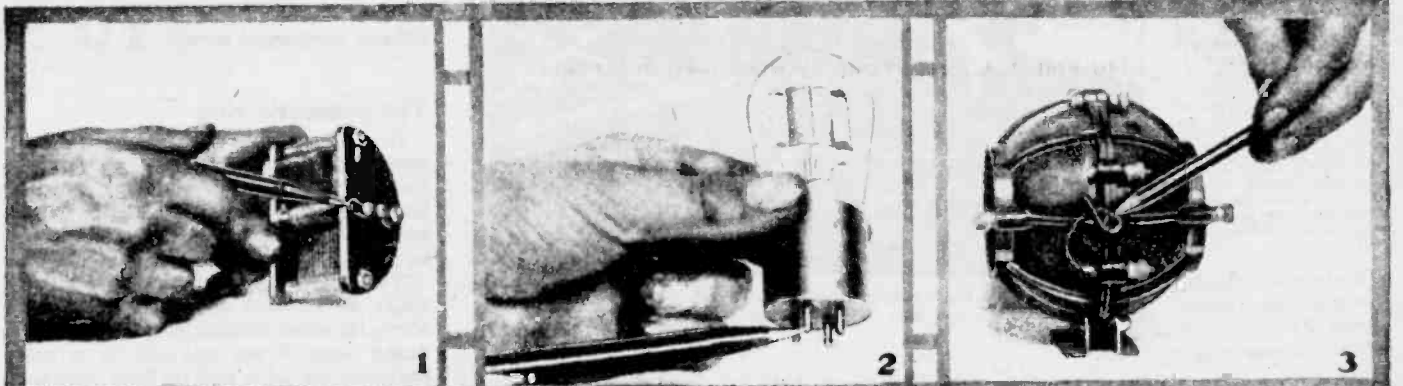
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Science and Invention for February, 1924

Radio Trouble Shooting

Illustrating Several Places Where Trouble May Be Encountered.

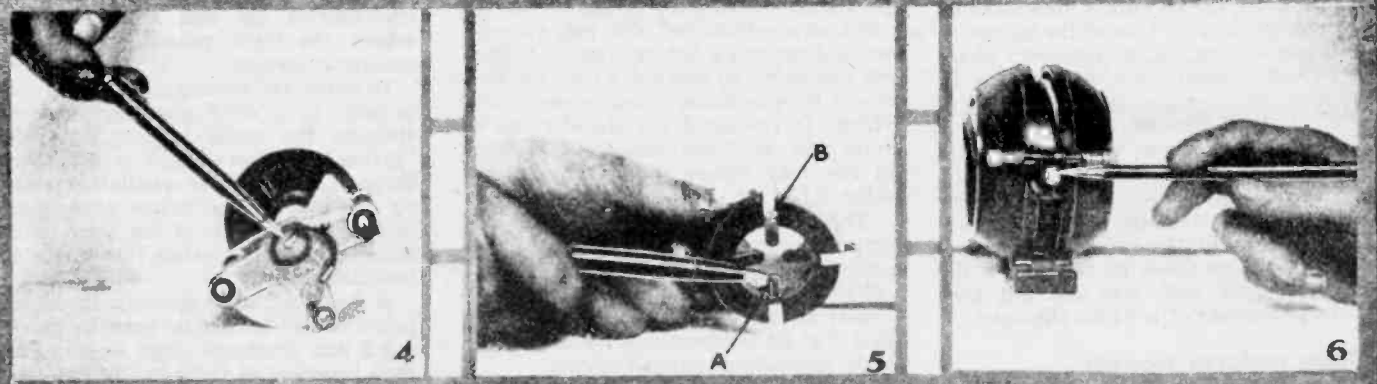
BY JACK MILLIGRAM.



One of the greatest bug-bears of radio instruments is the sliding contact. In the above photo, the pencil points to a sliding contact by means of which connection is made to the rotating plates of a standard type of variable condenser. Great losses are very often found here especially when the contact lever becomes loosened. Such connections should be avoided. If it is necessary to purchase instruments of this type, a flexible lead wire should be used.

Very often the base of a vacuum tube is the seat of trouble in a radio receiving set, but usually this is the last point considered by the amateur when hunting trouble. The pencil in the above photograph points to the end of one of the prongs of a vacuum tube. This point should be carefully cleaned with fine emery paper, making sure that no traces of the emery are left in the soft solder found at this point. Corrosion should not be tolerated at these prongs.

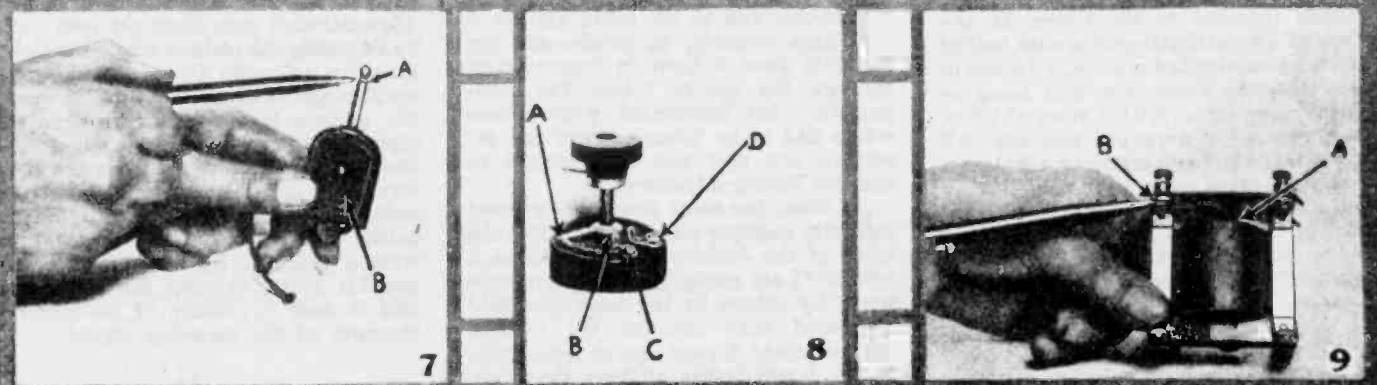
Variometers also have their troubles when it comes to the question of making connections to the interior or rotor coil. Above is shown one of the best forms of making such connections. The shaft on which the rotor is mounted is a hollow brass tube and through it are brought the leads from the rotor windings. These leads are of the flexible or "pigtail" type. Stops must be employed so that the rotor will not turn through more than 360 degrees.



The main trouble with rotary variable condensers was illustrated in Fig. 1. Above in Fig. 4 is shown a standard type of variable condenser in which this trouble is eliminated by the manufacturer. It is necessary for the "pigtail" to turn so as to follow the rotary shaft. Therefore, it must be thoroughly flexible so that it will not break after being turned several times. Here again stops should be provided so that the pigtail cannot twist too far.

Now we come to the troubles of the sockets into which the vacuum tube illustrated in Fig. 2 fits. Many radio ailments are attributed to innocent sources when in reality the blame should be laid on the vacuum tube socket. In the type illustrated above, point A shows one of the lugs bent out so that it does not make contact with the base of the tube. Point B shows where poor contact is very often found between the binding post support and the spring.

The best type of connection for the rotor coils of a variometer is shown in Fig. 3. Above, in Fig. 6, we illustrate a type of variometer which depends upon a sliding contact to connect the rotor coils to the external circuit. Sometimes this works very well, but after much use the bearings usually become enlarged from constant wear and fail to make proper contact. Obviously, such points cannot very well be lubricated and, therefore, the wear increases greatly.



A indicates the small insulating disc placed between the two parts of the plug which make contact with two separate springs in the jack. Very often this ring is made of fibre and when it absorbs moisture from the air it becomes a partial conductor. This point should be watched carefully. B indicates the portion of the plug in which contact is made between the phone tips and the plug. Only the type of plug which grips the phone tips firmly should be used.

There are several points on a rheostat which can give rise to trouble. In the above illustration, A indicates the contact arm. Sometimes this arm becomes loosened or the spring is weakened whereupon it fails to make contact with the coil. B indicates the connection between the switch arm and the shaft. This should be kept tight. At C is connected one end of the resistance wire. The binding posts at C and D should always be kept tight.

Very often the troubles in transformers are due to something which may readily be fixed. For instance, the connection indicated by B very often becomes loose, or if it is soldered, it sometimes becomes unfastened from the base of the binding post. A indicates the connection between the leads to the binding post and the actual windings of the transformer. No amount of strain, however small, should be placed on these leads under any condition.

1935



Acratone 5 TO 10 METER Transceiver 26 TO 62 Megacycles

Input to Oscillator 10 Watts Max - Regeneration Control - Tone Control
Variable Antenna Coupling Condenser - Battery, 6 Volt or 110 Volt Operation

The versatile Transceiver that you can use with batteries for portable or field work, or with a 6-Volt Power Supply when used in automobiles, or with a 110-Volt A. C. Power Supply when used in the home.

MUSEUM NEWS

Stuber Gives Radios To State Historical

On February 15, the curator and members of the planning committee for the newly funded Iowa State Historical Building, scheduled for ground breaking in July, met in Woodward at the Bill and Violet Stuber residence.

Bill had offered to donate his entire collection of fully restored and operating home radios, which date back to 1919 up through the 1920's to the early 1930's to the State if they were properly displayed for all who were interested to see and hear.

He volunteered help and advice in setting up the displays in manners which would give the general viewing public the best enjoyment and interest.

Certain radios will, with the push of a button, play recordings of actual original radio programs of the time, such as "The Amos and Andy Show", "Burns and Allen", "The Jack Benny Show", "Fred Allen", "Fibber McGee and Molly" and many more Stuber has in his possession.

There are a few makes and models of old radios Stuber is trying to acquire that will round out a good representation of home radio entertainment during that span of years, in Iowa and the midwest. If any of the readers have old radios stored away, regardless of condition, and are willing to donate them for this cause, contact Bill Stuber in Woodward, who will completely restore them and add them to the collection. The State will give visible credit to all contributors, adjacent to the item on display.

This does not imply that Stuber is quitting his hobby of restoring old radios; quite the contrary, he intends to continue by building up a similar collection and offer it to Forrest Park Dallas County Museum in Perry, providing they too, properly display it.

There is no monetary involvement whatsoever in these donations to the State except the cost of materials for restoration, which is absorbed by Stuber and given as part of the donation.

"This is a way of saving what is left of a part of Iowa's past for future generations.

WANTED

WESTERN ELECTRIC MOVIE EQUIPMENT

PHONE 03 — 824 — 5165

HORNS. 6A. 11A. 15A. 22A. 24A. KS12025.

DRIVERS. 549A. 555. 594A. 596A. 713A/C.

SPEAKERS. WE4151. 4181. 4194. 728A/B.

AMPLIFIERS. 8B/C. 9A. 10A. 11A. 24B. 41A. 42A. 43A. 46C/D. 55A.

59A. 60A. 86B/C. 91A. 92B. 124A/B/C/D/E. 129A. 130A.

MICROPHONES. 360A. 618A. 630A. 633A. 639A/B.

TRANSFORMER. PIC UP. ETC.

TUBES. 101D. 104D. 205. 242C. 249B. 252A. 262A. 271A. 274A/B.

275A. 284D. 300A/B. 301A/B. 306A. 350B.

RADIO TUBES. 112A. 171A. UV196. UV202. 213. 217. 222. 237. 145/245/345.

250/350/450. DE FOREST AUDICN. ARCTURUS AC.

SPEED TRIPLE TWIN. ETC.

BUT YOU DO NOT MAKE SO CHEAP PRICES. RECENTLY MANY PEOPLE WANT

THAT NAME TUBES. I THINK THAT THE TUBES ALL GO TO JAPAN.

I WILL TELL YOU WHY. TOKYO PRICES. TUBE No 112A-20\$. 227-20\$

245-70\$. 250-100\$. AT MY SHOP IN TOKYO. OTHER SHOP MORE EXPENCIVE.

BUT MOST WONDERING THING 12A. 27. 45. 50. 71A 80. IS QUARTER PRICES.

DO YOU NOW WHY. I WRITING THAT. SOMEONE GET A.R.C.A. MEMBER LIST

AND SEND LETTER MANY PEOPLE. NEGLECT THAT NO REPAIR TUBES IN U.S.A.

SEVERAL YEAR AFTER.

BE CAREFUL IF YOUR RECEIVED LETTER SAY SAMETHING.

PLEASE WRITE US LETTER IF YOU INTERESTED.

THREE MONTH ATIME I WILL COME UP TO U.S.A.

I LIKE FAIR. YOUR TRULY

P AND C ELECTRONICS. TOSHIAKI KURASHIMA.

NEW ADDDESS.

ICHIBANCHI ICHIGAYADAIMACHI SHINJUKU TOKYO JAPAN. 162

December, 1930

Science and Invention

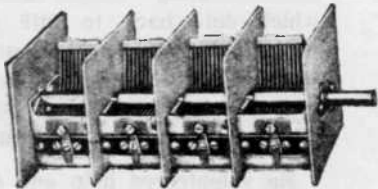
727

What's New in Radio

Some 1931 Ideas from the Seventh Annual Radio World's Fair

THIS year's Radio World's Fair, more than any other, demonstrated beyond question that the modern radio set has become as much of a household necessity as the very furnishings. That the industry itself is mature and stable was evidenced by the general perfection of design and finish,

same degree of intensity. Perfect reproduction involves not only perfection of tone. It involves also the perfect reproduction of light and shade in music. In other words, the original balance between the pianissimo and fortissimo passages of a musical rendering must be preserved, else the "colour" of the performance is entirely lost. Con-



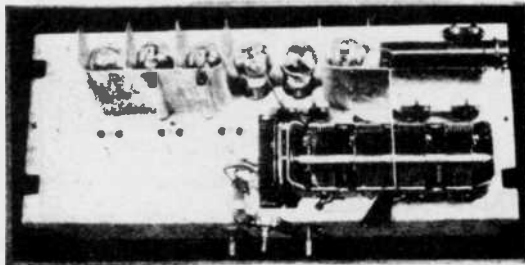
Left—New Hammalund gang midline condenser. Right—Miss Jeanne Dore up on a ladder tuning in on the world's largest radio receiving set. The set has 22 tubes and gives very clear reproduction.



both external and internal. New features were, with one possible exception, sound and conservative. There were no sensational stunt departures from generally accepted practice such as have, in years gone by, been offered to the public regardless of their real efficiency so long as they appeared to present a sufficiently plausible reason for attracting the not-so-technically-minded buying public.

The possible exception is the new feature, widely adopted this year, called the automatic volume control. Arguments in favor of this device are that the volume level remains the same at all times, unless manually adjusted, thus preventing overloading of the speaker on local stations, and fading when distant stations are being received. This feature, although new in broadcast receivers, has been in use for some years in commercial point-to-point short wave telegraph receivers, where it functions admirably. But in broadcast reception, we do not want a receiver which will automatically level out all signals to the

One of the midget sets, the Crosley Buddy, is a self-contained A.C. electric radio receiving set only 15 inches high, 15 3/8 inches wide and 9 1/4 inches deep. It has two screen-grid type -24 tubes in the R.F. stages, one screen-grid type -24 in the detector stage, one type -45 tube in the power output stage, and one type -80 tube as a rectifier.



Pictured above is the new R.C.A.-Victor Radio-Electrola with home recording. The cabinet is walnut-veneered, 46 inches high, 27 1/2 inches wide, and 18 1/4 inches deep. An interior view of the chassis is also shown.

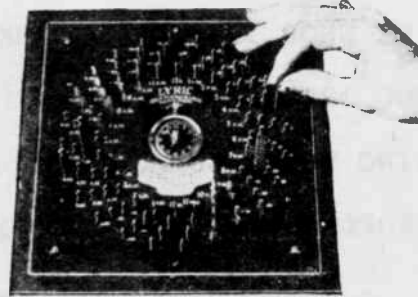
troverly raged around this point some time ago when it was the practice of the control room engineers at the broadcasting stations to reduce the volume of fortissimo passages and increase that of pianissimo passages. Having now got the transmitting end right, there is no sense in ironing out the volume level at the receiver.

Other features of this year's sets were straight line tuning scales with automatic lighting when the desired station is reached, one knob tuning, noise filters, phonograph connections, local-distance switch, humless operation, two-element detector tubes, pre-selector tuning, the increased use of shielding, which in some cases amounted almost to armouring, "whis-

per tuning," and tone control.

With automatic dial lighting, as the tuning control is moved over the scale, a light flashes up as soon as the adjustment for the desired station is reached, and in some cases the name of the station appears also. Pre-selector tuning enables the achievement of razor sharp tuning while at the same time admitting the full ten-kilocycle band width. By means of the local-distance switch the resonance curve of the receiver is widened when receiving from the local station, and narrowed for distance reception, so that cross-talk or side-band fringe interference from the local is eliminated. The whisper tuning feature reduces volume level to a whisper while tuning is being effected, thus preventing unwanted stations from blaring forth. By means of the new tone control, the listener can accentuate either the bass or the treble, according to his tastes, or in accordance with the particular acoustics of his home. An admirable feature, which should put an end to much acrimonious discussion anent the tonal quality of a particular set's reproduction.

So much progress has been made in the elimination of A.C. hum that this year's radio sets can be operated at low



A close-up of the new Lyric automatic 24-hour self-tuner, which fits under the top lid of the receiver in an easily accessible position.

volume levels without that disagreeable background hum becoming apparent, as has been the case in the models of past years. The addition of noise filters also eliminates (Continued on page 759)

crackles and minimizes static without impairing the quality of reproduction. The perfection and introduction of quick-heater tubes has eliminated that annoying wait for the receiver to become operative after it is switched on.

Home-recording is a new feature of an R.C.A. Victor 8-tube combination radio receiver and electric phonograph.

Phonograph pick-ups have undergone still further improvement, and were displayed in large numbers. A large number of receivers this year are equipped with a jack into which the pick-up can be plugged, thus instantly transforming the radio set into a phonograph reproducer.

Screen grid tubes are practically universal this season, either three or four of them being incorporated in the R.F. stages. One or two improved super-heterodynes employing screen grid tubes were also on display. It is claimed that these are more than four times as sensitive as the older models, and that many of the old faults of the superhet. have been eliminated.

Midget sets are very popular this season. These little sets are entirely self-contained and were displayed by over fifty manufacturers. They measure approximately fifteen inches square and eight inches deep, and are designed for use on the mantel shelf or other similar location. Small console sets, measuring only twenty-four inches in height, were also much in evidence. The flat tops of these sets come in very handy as small occasional tables.

One feature of the Seventh Annual Radio World's Fair remains unchanged—the radio sets are still silent. It is agreed that to operate all sets would involve a mass of aerials, and also a bedlam of noise. It is agreed also that there is but little difference between the present practice of inviting those interested to attend a demonstration at a near-by hotel and the practice, obviously necessary, of inviting visitors to automobile shows to make an appointment for an outside demonstration. But surely it is possible to demonstrate the quality of reproduction of the audio side of receivers by providing them all with the same input program, which could be supplied either from a central distributing station where phonograph records would be played, or by direct wire from the crystal studios. This practice has been followed very successfully during the past two years at the British radio show in London. In this way visitors are saved the great inconvenience and fatigue of trailing around a dozen hotels in the Times Square area—or going home without hearing anything of the abilities of the sets which they have seen. Also, it eliminates the necessity for setting up a public address system to provide incidental music for the entertainment of visitors. Granted, it provides no opportunity to demonstrate the sensitivity and selectivity of the R.F. side of the receiver, but it does go part way towards a solution of a real problem. What do our readers think?

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ELECTRON TUBE (ST shape)

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VT52.....\$7	2A3.....\$7
VT62/801A.....\$5	842.....\$5

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47.....\$7	50.....\$14
56.....\$4	71A.....\$6
80.....\$9	82.....\$5
83.....\$5	841.....\$7
842.....\$7	843.....\$7
1602.....\$7	10/VT 25.....\$11
UX 216.....\$4	201(black base)\$5
201(brass base)\$8	201(Top seal)..\$12
202(Top seal)..\$10	

LARGE SIZE TRANSMITTING TUBES

211.....\$12	845.....\$22
--------------	--------------

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PX 4.....\$10	PX 25.....\$12
DA 30.....\$12	DA 60.....\$15

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WE VT 1.....\$16	WE VT 2.....\$14
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WE 104(tennis).\$13	WE 205B/D/F...\$14
WE 211.....\$22	WE 212.....\$35
WE 216(tennis).\$13	WE 217(tennis).\$22
WE 242.....\$22	WE 244.....\$5
WE 252A.....\$22	WE 262A/B.....\$7
WE 271A.....\$12	WE 274A/B.....\$13
WE 275A.....\$12	WE 276A.....\$20
WE 284.....\$26	WE 293A.....\$4
WE 300A/B.....\$55	WE 301A.....\$10
WE 339A.....\$10	WE 345A.....\$8
WE 347A.....\$7	WE 348A.....\$7
WE 349A.....\$7	WE 350B.....\$17
WE 351A.....\$8	WE 442A.....\$8

*all above prices are UNUSED, in original box.
as for USED, no box, please quote for them (negociable)

Special wanted of this month!

RCA 50 (ST & antique globe shape).....\$17
 VT 52 (manufactured by RAYTHEON & W.E.)....\$10
 2A3 (single plate).....\$10
 866JH (antique globe shape, mfg. by TAYLOR).\$8
 WE 300B (printed JAN USN CW).....\$60

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HS-1 or other HS & HSM series(mfg. TRIAD)
 HA-103A or other HA & LS & CG series(mfg. U.T.C.)
 HF-20 or other HF & WF series(mfg. STANCOR)
 S-268Q or "S" & "K" series (mfg. PEERLESS)
 TO-330 or other "TO" series (mfr. ACROSOUND)
 27A04 or other "A" & "S" series (mfg. THORNTON)
 QGA 1 or other QGA & PGA series (mfg. FREED)
 T-6 or other "T" series (mfr. KENYON)

PICK-UP CARTRIDGE FOR SP & LP RECORDS.

4A & 9A cartridge & their arms (mfg. Western Electric
 10A (WESTREX) Company)
 variable reluctance cartridge VR & RPX or others.
 (mfg. G.E., others)
 "CRYSTAL" cartridge (mfr. WEBSTER & SHURE & others)

SPEAKER

G610 & G615 & others (mfr. JENSEN)
 4181A & 555 & 594 & others (mfr. Western Electric Co.)
 604/B/C/D/E & 755A/C others (mfr. ALTEC LANSING)
 other speaker for Hi-Fi (mfr. RCA & MAGNAVOX)

ELECTRON TUBE SOCKET

UV socket for UV 201
 100 R/L & 100M & 115B socket (mfg. Western Electric
 Company)

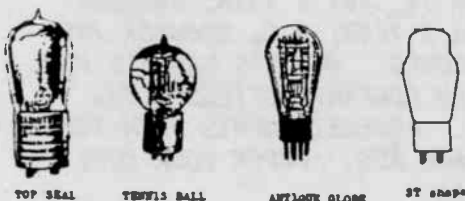
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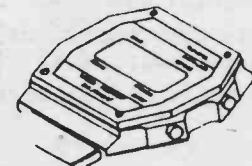
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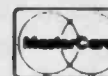
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MS-2

letters

Letter to Editor:

Collecting old radio pieces is becoming a specialty category. Most of my collector friends have one or two kinds of things they are saving--

My specialty has been horn speakers for over 5 years. My collection now numbers 126 all different and represents about one fifth of all horn models ever made.

Floyd Paul, W6THU
(818) 242-8961
Glendale, California

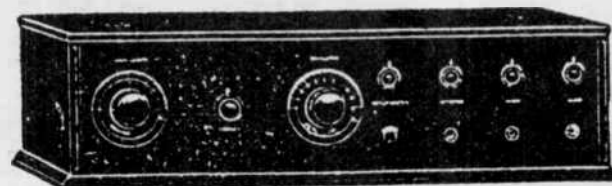
page 8..... The Horn Speaker, Box 53012, Dallas, Texas 75253-0012 June 1984 ..

THE OLDE TYME RADIO COMPANY

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RAY MINER

PH. (319) 372-1271

1215 AVENUE B
FT. MADISON, IA 52627

Dear Jim:

Wonder if you can help me out by publishing this letter? I am in a bind on getting my 1926 Neutrowound model "1928" set up to work.

The set uses either 199/299 tubes, 5 of them, and I can't find any. Is there some way I can substitute tubes by placing in an adapter?

Perhaps one of our fellow collectors can help me. If so, please write to me.

The 199/299 tubes are for radio frequency, first audio and detector. The set has a power supply.

George Friedrich
7162 Jacqueline Lake
Custer, Wisconsin
54423

Dear Jim:

I have been a subscriber of THE HORN SPEAKER for about 5 years and need some information.

I recently purchased a 6 leg radio table similar to the Atwater Kent Kiel table. However, the top is not hinged and when the front is let down the bottom board that would hold the chassis will pull out like a drawer. The speaker is facing down and remains fixed in back. The cross piece between the legs has two small bumps instead of the single large one as in the A. K. table.

Anyone know who made this and what model chassis it used?

Sincerely,
Ray Miner
1215 Avenue B
Fort Madison, Iowa
52627

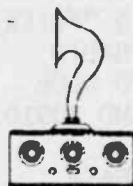
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E. F. Johnson telegraph key and
soudner \$35.00. Radiola 25
metal label \$8.00 and loop
antenna \$28.50. WANTED: stock
ticker. Satisfaction
guaranteed. Postage extra. Jack
Denny, 2929 N. Westmoreland,
Arlington, VA 22213. (703)
237-7411.

RADIOS 1920s and 1930s. Send
SASE for list. We also have
Edisons. Old Radio, 1030
Aviation Blvd., Hermosa Beach,
CA 90254 (213) 379-1213.

FOR SALE --- FOR SALE --
RIDERS, HOWARD SAMS, RCA, PLUS
OTHER SERVICE MANUALS, TUBES,
TEST EQUIPMENT, PARTS,
SPEAKERS, METERS, WIRE
RECORDERS, OLD AUTO RADIO'S,
OTHER RADIO ITEMS, MAGAZINES,
LIST E84 - 50 CENTS PLUS SASE
37 CENT STAMPS. KRANTZ, 100
OSAGE AVENUE, SOMERDALE, NJ
08083.

ALL ABOUT CRYSTAL SETS. New
book by Charles Green shows you
how to build crystal set
radios. \$7.95 ppd USA. ALLABOUT
BOOKS, DEPT H, P. O. BOX 4155,
Fremont, CA 94539.

For Sale- Unused and used radio
and TV tubes, used parts for
Majestic model 90-B, S.A.S.E.
for lists, Elmer Nelson, 11 S.
Church Street, Princeton, IL
61356.

CATHEDRALS- RCA 100, Majestic
370, Gloritone 26-D, Atwater
Kent, large Philcos. BATTERY
SETS Kennedy, Federals, Wares,
Silvertones, Neutrowound. Send
SASE or call (412) 656-0338.
Jerry Finamore, Rd 2, Box 623,
New Castle, PA 16101.

 FOR SALE- CATHEDRAL, BATTERY
 AND A.C. RADIOS. SEND SASE. J.
 ALBERT WARREN, BOX 279, WAVER-
 LY, PA 18471.

 DX. CRYSTAL, ONE TUBE sets,
 kits, plans, handbooks, coils,
 supplies. Obsolete tube quo-
 tations. Catalog \$1.00; none
 free. Laboratories, 1477-H,
 Garden Grove, CA 92642.

 FOR SALE: NEW (AND USED) RADIO
 TUBES AT OLD PRICES. SEND LARGE
 SASE FOR THE NEW DCL- SCFRY, NO
 MORE 71A'S AT \$3.75. WRITE FOR
 SPECIFIC PARTS, CUSTOM POWER
 SUPPLIES AND REPLACEMENT SETS
 OF TUBES AND/OR CAPACITORS WITH
 MAKE AND MODEL. SCHEMATICS AND
 SERVICE REPAIR INFORMATION.
 STAN LOPES, 1201 MONUMENT
 BLVD., CONCORD, CA 94520.



WANTED: EMERSON SNOW WHITE 1938
 AC-DC RADIO. SEND PHOTO AND
 PRICE TO KRIS GIMMY, 1441 NOT-
 TINGHAM DRIVE, AIKEN, SC 29801

WANTED: 1 TUBE SETS, CRYSTAL
 SETS, GREBE CR EQUIPMENT. RAY
 GARNER, ROUTE 1, BOX 320, BIG
 SANDY, TN 38221.

 ELECTRO- MEDICAL AND QUACK DE-
 VICES, BOOKS WANTED. INTEREST-
 ED IN FLOOR MODELS AND IN
 DEVICES WITH MULTIPLE KNOBS
 RESEMBLING RADIOS BUT WHICH ARE
 NOT RADIOS. I AM ALREADY SAT-
 URATED WITH VIOLET RAY DEVICES,
 SIMPLE 4D BATTERIES. PLEASE
 DESCRIBE AND PRICE. OLE LINDAN,
 1404 DORSH ROAD, CLEVELAND, OH
 44121

 WANTED: NON-CHROME SCOTT RADIOS
 PRIOR TO 1931. ALSO WILCOX LAB,
 EMEROLA AND OTHER RADIOS FROM
 MICHIGAN. JIM CLARK, 1006 PEN-
 DLETON, LANSING, MI 48917.
 (517) 323-9595.

 WANTED: WE ARE LOOKING FOR OLD
 ELECTRON TUBES. Our buying
 prices are: 2A3 \$6.00 -- 45/
 145/ 245/ 345 \$10.00 -- 50/
 250/ 350 \$12.00 -- VT-52 \$6.00
 -- VT-62 \$4.00 -- 202 \$10.00 --
 203A \$10.00 -- 210 \$10.00 --
 211 \$10.00 -- 224/ 227 \$4.00 --
 242C \$15.00 -- 82 \$4.00 -- 83
 \$4.00 -- 280 \$8.00 -- 281 \$8.00
 -- 845 \$20.00 -- 5691/ 5692/
 5693 \$6.00. For all the tubes
 that are originally boxed, es-
 pecially antique shaped tubes
 that are RCA boxed, we will pay
 extra charge of a \$1.00 or
 more. About used tubes please
 contact us. ---- Western Elec-
 tric brands: VT-1 \$15.00 --
 VT2/ 205B/ D/ E \$12.00 -- 101D/
 F / 102A/ D/ F/ G (only antique
 glass 101 and 102) \$12.00 --
 211A/ E \$20.00 -- 212D/ E
 \$30.00 -- 242A/ C \$20.00 --
 252A \$20.00 -- 262A/ B \$6.00 --
 274A/ B \$12.00 -- 275A \$20.00
 -- 284D \$25.00 -- 300A/B \$50.00
 -- 301A \$8.00 -- 339A \$8.00 --
 350B \$15.00 ---- P and C
 Electronics, ICHIBANCHI
 ICHIGAYADAIMACHI, SHIJUKU,
 TOKYO, JAPAN, 162

 WANTED: Operating manual for a
 National SW-5 which uses the
 5880 power box. Also need a set
 of coils or winding data with
 forms and wire to roll my own.
 Will welcome any past or pres-
 ent owner's experiences in op-
 erating this set. D'Arcy
 Brownrigg, P. O. Box 292,
 Chelsea, Quebec, Canada, JOX
 1N0.

 WANTED: Any brand of used
 working tubes or new; 2A3, 45
 (245, 345, 445), 50 (250, 350,
 450), 80, 81, 82, 83, 202,
 203, 210, 211, 224, 227, 242,
 845, 5691, 5692, 5693 and
 Western Electric equipment
 (such as tubes, amps., mixers,
 consoles, drivers, tweeters,
 horns, speakers, parts) tel.
 (818) 576-2642, David, P. O.
 Box 832, Monterey Park, CA 91754.

 WANTED W. E. ELECTRON TUBES. I
 buy most everything the
 Japanese buy, plus a lot more
 they don't bother with. I pay
 more, pay faster and I'm easy
 to contact. Call or write with
 anything of interest. Charles
 Dripps, 4331 Maxson Road, El
 Monte, CA 91732. (818)
 444-7079

 WANTED - CASE FOR RADIOLA III,
 balanced amp. Also need AK35
 junker. Thomas Estes, 5555 W.
 Gulfbank #91, Houston, TX 77088

 WANTED: ANY AND ALL INFORMATION
 on the "Radio-Pen" facsimile
 receiver by John V. L. Hogan,
 August 1934 Radio News. Anyone
 who owned and operated? D'Arcy
 Brownrigg, P. O. Box 292,
 Chelsea, Quebec, Canada, JOX
 1N0.

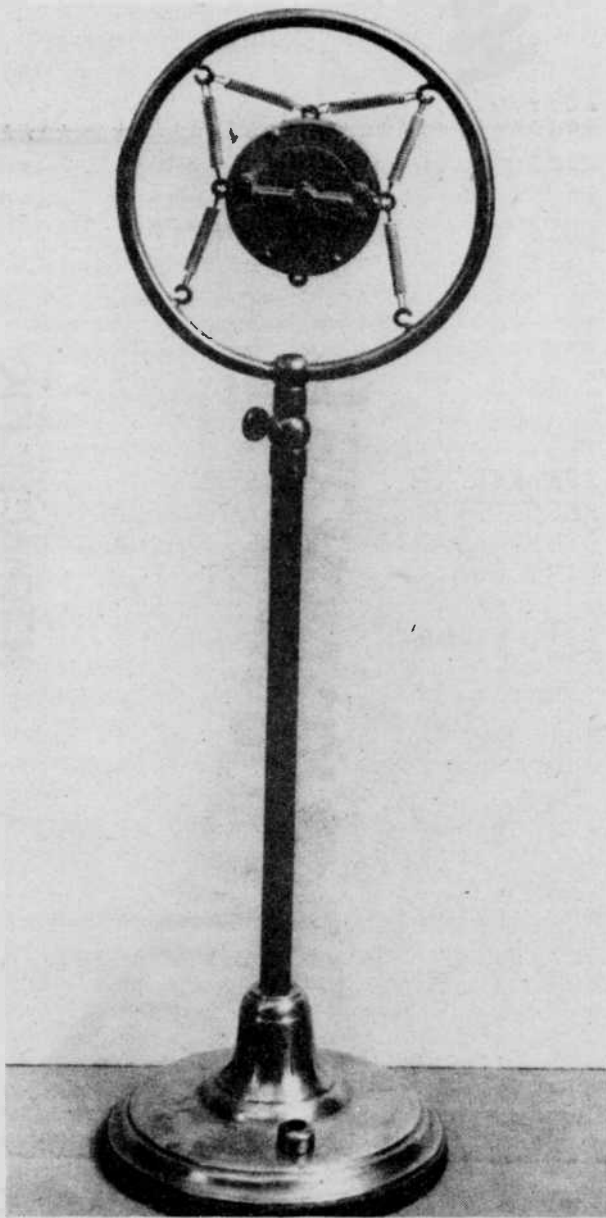
 PORTABLES: SUITCASE TYPE, PRE-
 1930, for collection and
 research. Can be kit or
 homebrew. Rosenthal, 507 S.
 Maryland Avenue, Wilmington, DE
 19804.

 ATWATER KENT MODEL 85 CHASSIS
 IN good condition, or will buy
 set complete. Will buy 85-F if
 same? chassis? Advise. Ronald
 Burtzos, 915 Crane Drive, Apt.
 703, DeKalb, IL 60115.

 PARAGON A-2 AMPLIFIER, KENNEDY
 521 amplifier, Burns red or
 white horn. Jerry Finamore, RD
 2 Box 623, Newcastle, PA 16101
 Phone (412) 656-0338.

 WANTED: PRIVATE BRAND 32 VOLT
 FARM RADIOS, ANY CHASSIS,
 CABINET OR PART IS WELCOME.
 JAMES FRED, R1, CUTLER, IN
 46920.

WANTED



MICROPHONES of this kind or any
 nice ones from 1920 to 1940's.
 Please send photos with prices
 to 1900-2000 gallery- 8, Rue
 Bonaparte- 75006 Paris France.

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