Synchronized Broadcast Joins Images and Music

Wire Transmission of Image-Frequencies and Radio Reception of Sound Enable Audience to See as Well as Hear Miniature Drama

A FORETASTE of the radio television of the future, accompanied as it will be by radio "teleaudition," was given to radio fans in Newark, N. J., during the week of August 19, when a demonstration of "wired television" synchronized with musical radio reception was presented at the huge department store of L. Bamberger & Co., owners of station WOR. On its sixth floor the transmitter and receiver, linked together by short wire lines, had been installed by their manufacturer, the Daven Radio Corporation of the same city; and two-hour marionette performances were daily enacted before the transmitter and reproduced before the eyes of the radio spectators in synchronism with the music broadcast at the same time from WOR. The little dance of the puppets was repeated each two minutes during the period of the demonstration; as the limitations of the lamp and screen used in the receiver, as in other present-moment television apparatus, prevent the image from being seen by many at once.

"It is our belief," said a representative of WOR, explaining the reason for holding the demonstration at this time—that of giving the public a basis on which to found an idea of the coming importance of television in radio programs of the comparatively near future—"that television broadcasts will eventually be combined with the simultaneous transmission of speech and music; but this is impracticable at the present moment, from the viewpoint of both transmission and reception. However, by the use of a wire line, we are able to present the effect of synchronized reception of a radio program consisting of simultaneous music and television."

THE SYSTEM EMPLOYED

The "wired-television" apparatus employed is similar in principle, of course, to other installations recently demonstrated over radio channels, both short and long-wave. The transmitter comprises a 48-hole scanning disc, 24 inches in diameter and rotated at 1,000 revolutions per minute by its motor, and four 7-inch photoelectric cells. A 900-watt tungsten lamp produces the light beam which the scanning disc causes to "explore" the field of its subjects a trifle over sixteen times a second. A condensing lens aids in this task of illuminating the miniature stage. The light reflected, spot by spot, from the surfaces covered by the dancing beam emitted by the lamp is converted into electrical pulses by the photoelectric cells; and these signals are passed through a six-stage resistance-coupled amplifier of special design to handle the combination of audible and supersonic frequencies which makes up the television band.

The arrangement of the apparatus appears in the illustration; the scanning disc may be seen directly in front of the demonstrating engineer, and the source of illumination is housed in the hood behind the disc. The frame before the disc contains the four photoelectric cells and the first five stages of the amplifier. The final stage of 210-type tubes, in push-pull, is contained in the small box on the table at the right, and the "B" power-supply unit is in the larger box beside it.

RECEPTION ADJUSTMENTS

Since the range of frequencies required by the television dramas ran far beyond available broadcast channels, the transmitter was connected directly by wire to the receiver on the same floor. The latter apparatus also is standard: it is housed in a wooden cabinet, approximately 30 inches high and wide, and 8 inches deep. The assembly comprises the conventional scanning disc with its motor, and the neon-filled glow-tube. The controls on the front of the housing include a resistor governing the speed of the motor, a switch turning it on or off, a rheostat regulating the direct-current voltage across the plates of the neon tube,

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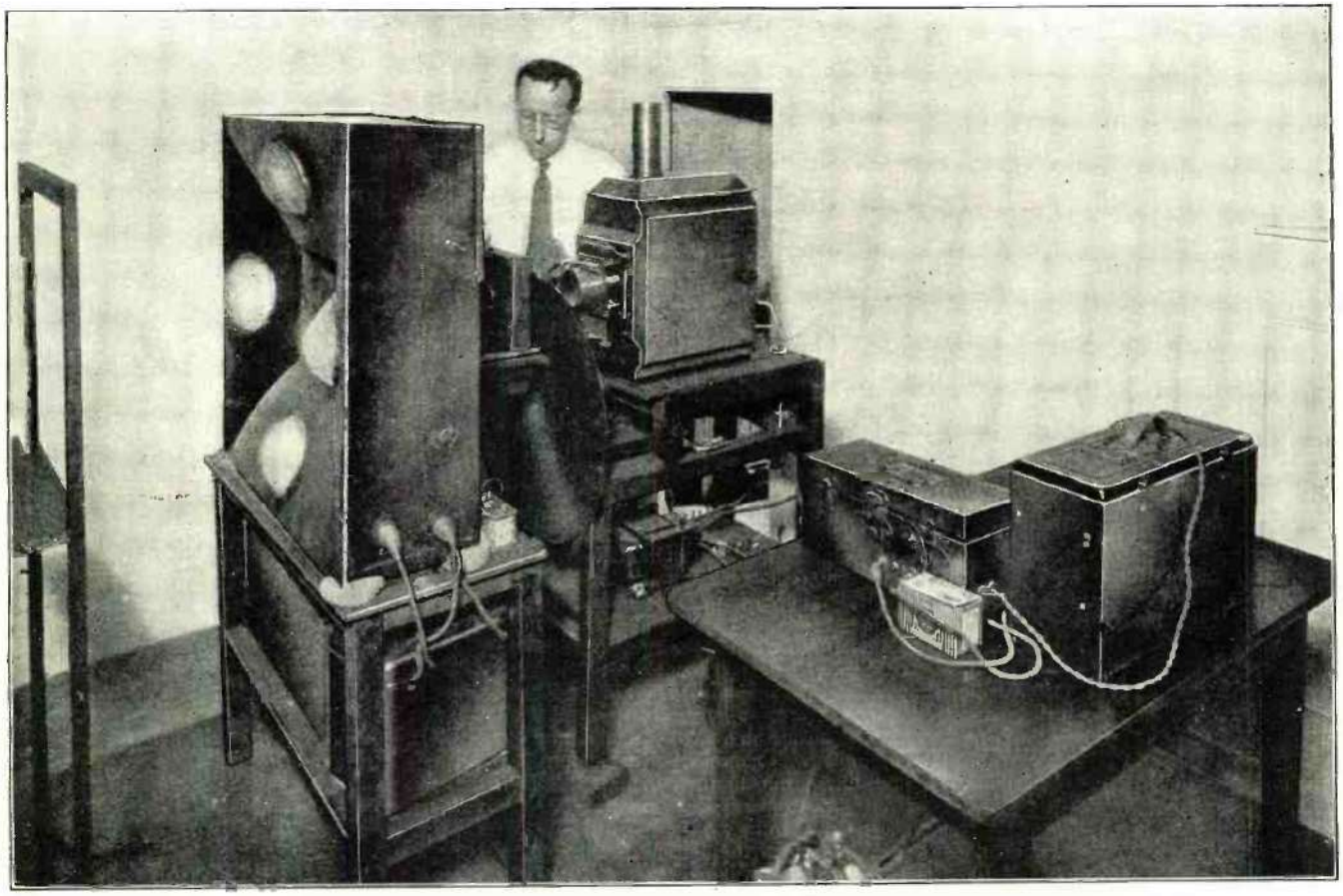

Set up of the television transmitter used at WOR during the synchronized transmission. The puppets' "stage" is at the extreme left; the apparatus is of the usual type.

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and another switch opening and closing the television-lamp circuit.

To maintain the scanning disc of the receiver in synchronism with that of the transmitter—a requisite to the production of a recognizable image—delicate adjustment is necessary. This, as in other manual synchronizing systems, is accomplished by the simple expedient of varying the series resistor of the motor; this is a task quickly mastered by the experienced operator, but one which requires continual attention.

PROBLEMS YET FACED

While this exhibition is in the widest sense "television," it is not true radio vision—bearing exactly the same relation to the latter that the "Wired Wireless" described in last month's RADIO NEWS has to the broadcasts picked up by the listener's aerial. The problems of operating such a television system over wires are very similar to those of broadcasting; except that in the latter case modulation and demodulation of a radio frequency are necessary to obtain distant transmission. And, at the present time, wide-frequency channels are acquiring a value comparable with that of the Kohinoor, which is hardly rarer.

Whether the medium of transmission is ether or copper wires bears but little on the main problems, of creating the "vision-impulses" at the transmitting end with sufficient energy to impress them on a photoelectrical system distinctly, and of synchronizing the receiving mechanism until a clear image will remain in the field of sight. The problems of amplifying a "television-frequency" band, wider than the audio band, through many powerful stages, are also alike in either system; though broadcasting and wire-line transmission have also well-known specific problems of their own. In any event, we may look forward with confident expectation to a not far-distant day when we shall hear and see together from a single, if complex, assembly of receiving apparatus.

"Ventilation" in the 227-Tube Obtained by Mesh

WHY the mesh-plate instead of a continuous sheet of metal in the UY-227 heated-cathode tube? Many users of this tube have wondered about the reason for this change in the design of the outer element.

During the development of this type of tube, the laboratory engineers found that emission of electrons occurred, not only from the cathode, but also from the cylindrical grid and plate unless they were relatively cool. This would be an undesirable condition in the operation of a device of this kind, as it would set up conflicting currents in a radio receiver.

To allow the plate to remain cool, and to eliminate undesirable electron emission, the use of a wire-mesh plate was adopted, thus allowing the escape of much of the heat generated by the heavy current through the filament; the wattage of the 227-type heater is 3½ times that of the 201A-type filament, and the generation of heat consequently proportional.

Hertz discovered radio waves in 1887, twenty years after Maxwell calculated that they must exist.