

Television Reduced To

The General Electric Company, at Schenectady, is experimentally broadcasting television.

Here is all the data that is needed to enable the radio fan to pick up these signals and make a picture out of them.

The purpose of the following description is to point out the essentials in the method and show how simple the receiving apparatus may be.

Reduced to its easiest terms, television reception consists of some white and black dots arranged in proper order on a flat screen at persistence-of-vision speed. This is strikingly illustrated when one cuts off the motor and discovers that the picture instantly vanishes and in place of it is a great collection of unrelated dots.

With a neon lamp and almost any motor to rotate a suitable disc, these radio signals can be made into a picture. With the only lamps available at present, the pictures will not be very large. The lamp first referred to is the General Electric Co.'s G-10 lamp, 1/4 watt, cylindrical off 48 dots, spaced very accurately in even decre-

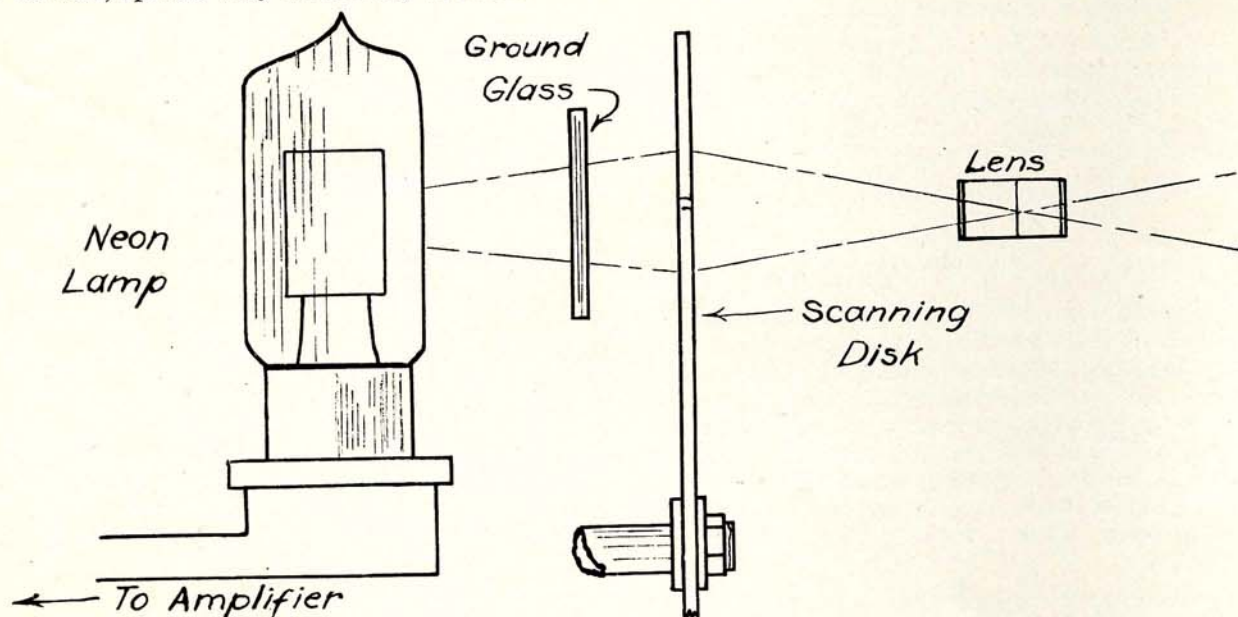
audio stage of the receiver. The incoming signals blink this light in a picture order.

You can listen to these picture signals but they don't make sense. However, if you will start the motor and look at the neon lamp through the flying holes in the disc you will see a lot of black and white dots and dashes scattered over the picture area and probably without intelligible order at first.

If however, the speed of the disc is slowly increased until it is in synchronism with the transmitting station, a perfectly formed picture suddenly flashes out on the picture plane.

The picture will tend to move to the right or left but by increasing or decreasing the speed of the motor the picture can be held rather steady in the lighted plane.

If you are in the direct current district, a direct current motor with an adjustable rheostat in the field of the motor, gives the necessary speed adjustment to bring the disc into synchronism with the transmitting station. Another



The motor should be at least 1/16 h. p., and preferably attached to the house-lighting circuit. A flanged hub is mounted on the motor shaft to carry the scanning disc.

The disc is 12 inches in diameter and has 48 tiny holes therein, arranged about 5/8 inch apart and in a spiral of a mean diameter of 9 1/2 inches. The holes should be approximately 1/32 inch in diameter; and the inner end of the spiral is 5/8 inch shorter radius than the outside end.

The neon lamp is attached, like a loudspeaker, to a radio receiving set, with perhaps 250 volts of battery in the circuit. You may find it desirable to increase the bias on the grid. The above voltage is only necessary when using the

smaller adjustable resistance in series as a vernier helps to more easily hold the motor in synchronism.

If you have only alternating current available then the cone pulley arrangement must be used. For that matter, the cone pulley scheme can be worked with any kind of motor.

The making of the disc is difficult, but it can be bought very cheap. Here is what is needed if the disc is to be made—cardboard, or black piece of paper. Cut a 12-inch disc out of it, with an accurately located centre opening to go on the flanged hub on the motor. On this disc lay out 48 dots, spaced very accurately in even decrements of radius to give about a 5/8-inch offset of

Its Simplest Terms

By L. SIGMON

the ends of the resultant spiral arrangement of dots on the disc.

Take a sewing needle. Break off the eye and the point. This is to be used as a punch to cut tiny holes in the disc where you put the dots. Lay the disc on a block of wood sawed so short that the punching can be done in the end grain on the wood. Or get a piece of lead, and scrape it smooth and cut the holes in the disc by punching out the tiny discs of paper, with the needle-punch, which will leave the holes in the paper cut clean.

Thin metal sheet or bakelite, or almost any other material can be substituted for the paper or thin cardboard disc, but the paper disc is easier to make.

A suitable hub, with nut and two washers between which latter the disc is clamped is also needed.

A ground-glass plate about one inch square is mounted near the rotating disc. It may be on either side, that is, next to the lamp, or on the opposite side of the disc from the lamp, in alignment with the holes in the disc. In the first mentioned position one looks at the illuminated disc through the tiny holes; in the other position the glass is illuminated by the light from the lamp shining through flying holes, to build up the picture.

The ground-glass can be made, if it is not readily available, by rubbing a piece of clear glass on a very fine sandpaper to which a little oil or turpentine has been applied.

Mat celluloid film or mat surface mica will also answer very well. The impression of good workmanship is heightened if one mounts it in a small frame, like a picture frame.

The radio picture signals broadcast by WGY are sent out from pictures made up of 48 lines to the picture. The rate is about 16 to 18 complete pictures per second.

The received picture can be made to seem about a $1\frac{1}{2}$ inch square by looking at it through a reading glass, or a condenser lens such as is used in magic lanterns and motion picture theatre projectors.

The best type of amplifier to use with "Television" is, the resistance-coupled amplifier, either the three or four-stage type.

If resistance-coupled amplifier is employed, it will be necessary to raise the detector B-voltage in the receiver to an approximate value of 45 to $67\frac{1}{2}$ volts.

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