Amateur Television

By Paul H. Thomsen*

THE General Electric Company, at Schenectady, is experimentally broadcasting television[1].

These are all the data that are needed to enable the amateur to pick up these signals and make a picture out of them.

It will be recalled that when Mr. C. Francis Jenkins, himself a member of the A.R.R.L., showed government officials visiting his laboratory, June 13, 1925, what was happening at the moment in the Anacostia Navy Radio Shack, NOF; he made the prediction that sooner or later the amateur would get a new kick out of radio by picking pictures out of the air. The first published account of this work appeared in *QST* for July of that year.

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 lowest 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 costing one dollar, and almost any motor to rotate a suitable disc, these radio signals can be made into a picture. While with the only lamps available at present, the pictures will not be very large, it is fair to suppose that more suitable lamps will be available soon. The lamp first referred to is the General Electric Co's G-10 lamp, ¼ watt, cylindrical electrodes, medium screw base.

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" in diameter and has 48 tiny holes therein, arranged about ⅝" apart and in a spiral of a mean diameter of 9½". The holes should be approximately 1/32" in diameter; and the inner end of the spiral is ⅝" shorter radius than the outside end. (See Fig. 1.)

The neon lamp is attached, like a loudspeaker, to a radio receiving set, with perhaps 250 volts of battery in circuit. You may find it desirable to increase the bias on the grid. The incoming signals blink this light in a picture order.

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1. Information as to transmitting schedules and wavelength has not been announced but the signals can be located by listening for them.—Ed.

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

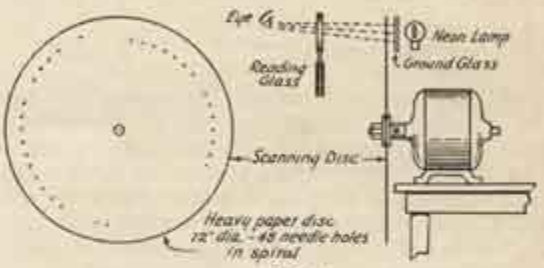

FIG. 1

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 in the picture plane.

The picture will tend to move to the right or to the 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 d.c. district, a d.c. motor

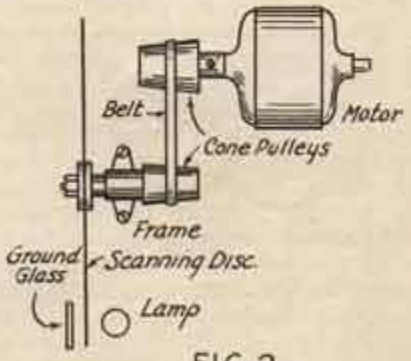

FIG. 2

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

If you have only a.c. juice available then the cone pulley arrangement shown in the

illustration is better. For that matter, the cone pulley scheme can be worked with any kind of motor. (See Fig. 2.)

The making of the disc is not difficult. Get a cardboard, or black piece of paper, or

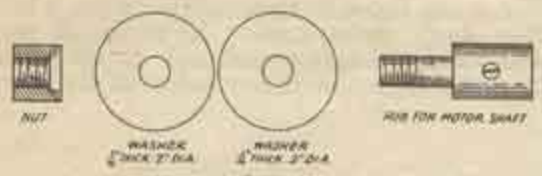

FIG 3

even the cover of dad's Saturday Evening Post. 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 off 48 dots, spaced very accurately in even decrements of radius to give about a ⅝" offset of the ends of the resultant spiral arrangement of dots on the disc.

Now 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. If you find the needle hard to hold, put it in a small stick, and hold the stick. Lay the disc on a block of wood sawed so short that the punching can be done in the end grain of the wood. Or get a piece of lead, and scrape it smooth, and cut the holes in the disc by punching out tiny discs of paper, with the needle-punch, which will leave the holes in the paper cut clean.

Of course, thin metal sheet or bakelite, or most any other material can be substituted for the paper or thin cardboard disc, but the paper disc is easier to make and is just as good if it is not torn.

About the only thing you will need to get made outside is a suitable hub, with nut and two washers between which latter the disc is clamped. The illustration shows how it should be made. (See Fig. 3.)

A ground-glass plate about 1" 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 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 very fine sandpaper to which a little oil or turpentine has been applied.

Of course, 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, but to know the exact rate is not important because the motor of the receiving machine is speeded up until the picture appears, no matter what the rate may be.

The received picture can be made to seem about a 1½" 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.

We understand Mr. Jenkins will also be broadcasting movies soon, with the same number of lines per picture, which will add another source of pictures for the amateur.

Central Division Convention

May 25, 26, 27, Milwaukee, Wis.

YES! fellows, the Milwaukee Radio Amateurs' Club is taking the bull by the horns and is sponsoring the first big Central Division Convention to be held at the Republican Hotel in Milwaukee, Wisconsin, on the above dates.

The mayor of the city will give the address of welcome to the delegates. Lectures and demonstrations of electrical phenomena will be given at the School of Engineering. Entertainments of all kinds have been arranged to give those who attend all the pleasure possible. Prizes will be awarded to winners of stunts.

Two men from A.R.R.L. Headquarters will be with us; F. E. Handy, Communications Manager and one other. We are doing our best to prevail upon Secretary-Editor K. B. Warner to drop his mantle of responsibility and be our guest of honor. Director Darr will be here and act as toastmaster.

From the above you see what we are trying to do for you and we extend to everybody a cordial invitation to attend.

Let's hear from you, gang. Write Frank J. Jutrash, 9ALL, Chairman, 385 Eleventh Ave., Apt. 5, Milwaukee, Wis., for reservations.

Strays

Durham metalized resistors may now be obtained in values from 250 to 3,000 ohms. They are designed for use in grid circuits of radio frequency amplifiers to keep them from oscillating. The fact that they have a very small amount of self inductance and capacity should make them suitable for various jobs around the work table of the experimenter.