Building A Simple Stroboscope *for* Synchronizing Television Discs

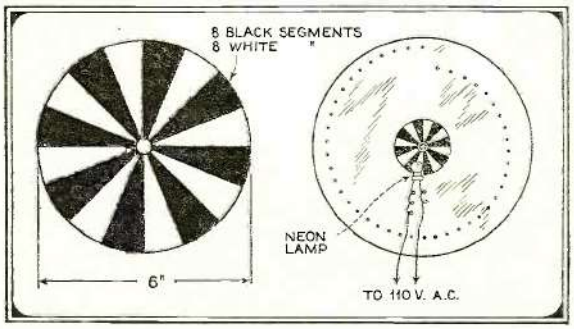
Synchronization Now Remains the One Big Problem in Television. Many Mechanical and Electrical Schemes Have Been Employed as a Solution and the One Described Here, a Mechanical System, Is One of the Simplest

By H. N. Bliss

AT the present time there is nothing very difficult about obtaining good clear images with a television receiver which is equipped with an accurately drilled scanning-disc capable of reproducing pictures an inch and a half square, and fed by a high-quality amplifier; provided, of course, that the received signals are loud, and free from static and interference. The one outstanding difficulty experienced by the writer, and no doubt by everyone who has experimented with television at home, is that of managing to keep the received picture still long enough to make sure just what it is before it floats off out of the frame to be replaced by another higher up or lower down.

At this point the operator usually makes an over-adjustment either up or down in speed in his anxiety to keep the picture in the frame, with the result that the pictures spin rapidly around either to the left or right and when synchronism has again been obtained (for the moment) ten to one the legs of the image are visible in the top of the frame, while the head is moving around legless at the bottom. This necessitates changing the speed again very gradually until the pictures travel around into the frame and then doing it all over, again and again.

In casting about for a remedy the writer appropriated the idea incorporated in the well-known Victor sixty-cycle stroboscope. This is a small disc of white cardboard printed with ninety-two black segments, which, when placed upon a phonograph record and lighted by a sixty-cycle lamp appears to stand still when running at exactly seventy-eight revolutions per minute.



To the left is a stroboscope disc as described in this article. Its application to the scanning-disc is shown at the right

A little calculation evolved the formula: $N = \frac{60}{\text{r.p.m.}} \times 120$ in which N equals the number of black segments needed, and R.P.M. is revolutions per minute of the disc desired.

For receiving standard television signals (48 lines 900 R.P.M.), eight segments are required and a six-inch disc of white cardboard was cut out and divided into sixteen equal parts by radial lines. Eight of these pie-shaped segments were blacked with india ink and the disc glued to the scanning-disc and illuminated by one of the small sixty-cent neon lamps attached directly to the house lighting circuit. Upon trial this was found to be a great help, making it possible to get the outfit up to proper speed with little loss of time, and to devote some time to experiment with speed control without wasting time during a broadcast. It was found that while watching the picture the black spokes were always visible to the eye even though one was not looking directly at them, and any tendency to creep could be instantly noted and a speed correction made before it became serious.

One may well ask why not use a synchronous motor and be done with it and the answer is that unless you are lucky enough to be on the same power net-work as the transmitting station a synchronous motor geared directly to the scanning-disc will probably not provide sufficient accuracy, as here in Ithaca, N. Y., it is necessary to let the spokes of the stroboscope creep very slowly in an anti-clockwise direction in order to stay in phase with the Jenkins transmitter in Washington.

Obtaining Illumination of the Disc

A more brilliant illumination of the stroboscope disc may be obtained by polarizing the neon lamp by means of a forty-five volt B battery inserted in series with the lamp and one of the a.c. leads to it. This will cause the lamp to flash only sixty times per second instead of one-hundred-twenty and will require only four black segments on the stroboscope disc.

The writer believes that the ideal combination consists of a synchronous motor driving the scanning-disc by means of a friction roller capable of sliding adjustment for speed regulation as has been described elsewhere, and a stroboscope as described above to show the correct amount of creep.

The Television Receiver

A word concerning the receiver and amplifier used by the writer for the reception of television signals may be of interest. A great deal has been written concerning the necessity of using a special resistance-coupled amplifier in order to obtain undistorted pictures, and while this is perfectly true if absolute perfection is desired, surprisingly good results may be obtained by using any amplifier capable of first-class musical reproduction; in fact, the distortion due to static and interference of one kind or another is apt to be much more serious than any frequency distortion, especially for the man located one hundred and fifty miles from the transmitter.

It is unfortunate that the wave-band assigned to television seems to suffer a great deal from fading and interference due to broadcast station harmonics, but the patient operator will be rewarded quite often with the reception of strong, steady signals which will make it all worth while.

The writer uses a modification of the "Q.S.T. All-Purpose Superheterodyne," whose second detector is arranged for linear power detection. The output of this detector is fed through a high-grade transformer, having high primary inductance, directly into one 250 power tube supplied with six hundred volts on its plate and is capable of overloading it quite easily.

The Raytheon Kino Lamp used in the television outfit is fed from the plate of the -50 through a stopping condenser.