At Home with the Fultograph—*continued*

A greatly enlarged picture to show how the received image is built up.

reproducing the transmitted picture at the receiving end, in synchronism with the transmitter.

Obviously it will not matter whether it is a photograph, a drawing, a cartoon or letterpress, the receiver should faithfully reproduce these variations of light and shade if only we can perform this series of operations just described.

Many Methods

The Fultograph apparatus performs just what we want it to do in an extremely ingenious manner. The actual methods used for converting the light and shade at the transmitting end into variations of strength of electric current are rather complex and, as a matter of fact, can be carried out in several different ways.

One method used for the 5 X X transmissions up to the time of writing this article is to prepare special forms of negative on copper foil, but before these lines appear in print it is probable that a new photo-electric method will be installed by which variations of light and shade will affect a photo-electric cell and vary the current in this way. All kinds of methods are possible, but they do not affect the general principles we are describing.

Before we go farther let us briefly consider what happens with ordinary music when it is broadcast. The violin player, for example, playing his instrument in front of the microphone, causes a varying electric current in the microphone to operate

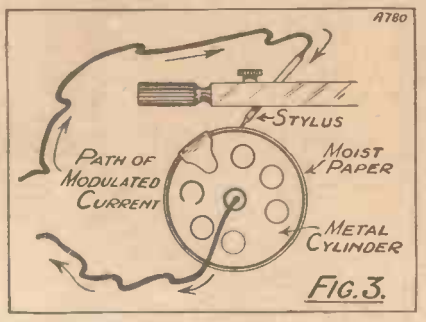

FIG. 3.

the transmitter, and the carrier-wave which is radiating at the frequency of the transmitting station varies in amplitude according to the variations of the music.

At our receiver we tune to this carrier frequency and our detector gives us a rectified current of varying strength, these variations being passed through transformers or resistance-capacity-coupling units, and appearing as variations in electric current in our loud-speaker leads. Remember it is only variations of current or potential that can be amplified; a steady direct current through the primary of a transformer, for example, will produce no effect at all in the secondary, and it is only when the current varies that corresponding variations are set up in the secondary and so passed on.

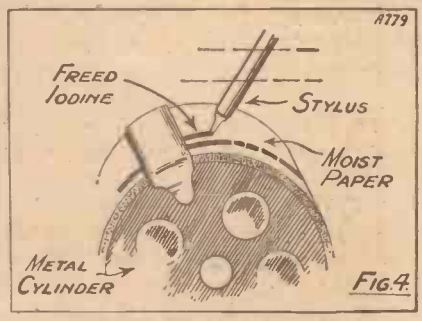

FIG. 4.

1,500-Cycle Note

Now, returning to the Fultograph transmitter, let us assume that the stylus is travelling over a black portion of the picture. Theoretically we should want a steady, strong current here, but a steady current in our receiver would have just the same effect as no current at all. Both would give no current whatever in the loud-speaker leads. If, however, we break up our steady strong current at the transmitting end, say, 1,500 times a second, then we shall get 1,500 strong pulsations per second in our loud speaker.

If all the variations of the transmitted current in the Fultograph are similarly broken up 1,500 times, then a strong current will give strong pulsations, and a weak current will give that numberof weak pulsations, in the receiver per second. No current at all, of course, gives no pulsations. It was for this reason that the Fultograph signal consists of a modulated 1,500-cycle note.

There is no special virtue in the particular frequency chosen—it must not be too high or too low, and one is chosen which proves quite suitable.

If you have an opportunity, try and tune-in to a Fultograph transmission and listen to it on your loud speaker. These transmissions occur every day except Sundays and Mondays from 5 X X between 2 and 2.30 p.m., every day either between 12.45 and 1.15 (1.30 p.m.

These illustrations show faults. The first picture shows the effect of running the receiver too fast and with too strong a signal. The picture is elongated and too dark. The second shows a portrait from Vienna completely spoiled by continuous interference from Morse, while the third shows the effect of running the machine without grid bias. Here the synchronising does not occur.